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INDUSTRIAL-ARTS MAGAZINE

Vol. VII SEPTEMBER, 1918 No. 9

Some Aspects of Rehabilitation Work for Disabled Soldiers

George C. Greener, Director, North Bennet Street Industrial School, Boston

IT is fortunate for our country which is now confronted with the problem of the vocational future of disabled soldiers that more than a year and a half ago the Federal Government officially recognized the place and need of vocational education in our public school system. The passage of the federal vocational bill—Smith-Hughes law, in 1917 established as fundamental, that vocational education is an integral part of our national educational system. Ten years prior to this enactment, the National Society for the Promotion of Industrial Education (now the National Society for Vocational Education) began its research and publication work by which studies of the materials and methods best suited for the training of our young people for the trades were made generally available. One valuable function of this society, not always definitely recognized, has been the education of public opinion concerning the place of vocational training in a democratic society. The results of their work are especially timely now that we are facing the problem of the returned disabled soldier requiring vocational re-education. The National Society has contributed to the removal of popular indifference and unpreparedness towards this problem, thus relieving it at the start from a fundamental difficulty and obstacle. We are, therefore, able to build upon ten years of constructive ground-work and a national system of vocational education—facts which help to remove the problem from the class of emergencies and place it in that of organized educational effort.

Following upon past wars there has been no general effort of a constructive character to restore the disabled soldier to useful employment. The only obligation which governments have acknowledged is represented in the payment of a monetary award in the form of a pension. Some men have been maintained in soldiers' homes. The consequence, in either instance, has been an existence of idleness and dependence which has tended to demoralization rather than to reconstruction.

Happily this policy is in process of change. It has been demonstrated that the cripple, tho debarred by his handicap from some occupations, could, almost without exception, be fitted by special training for some trades in which he could be self-supporting in spite of his disability. The great increase in industrial activity during the past two decades brought about a corresponding increment in the number of employees crippled in work accidents. Injuries were particularly frequent in the period before the advent of the safety propaganda. The state authorities, especially in Europe, became intimately identified with workmen's compensation, and in many instances, themselves assumed responsibility for the payment of the compensation award.

The waste involved in the complete support of thousands of workmen injured in more or less serious degree became soon apparent, and the authorities cast about for some means to decrease the percentage of disability. The solution was found—notably in Belgium and France—in trade schools for the re-education of the crippled victims of industrial accidents. In these schools the man who has lost the use of a leg is trained for a trade at which he can work while seated; the man lacking an arm is prepared for an occupation in which two legs and the sound arm suffice for its pursuit. Since the demand for skilled labor generally exceeds the supply, it is entirely practical to place at steady employment men trained thoroly in wisely selected trades. Of course there are many difficulties to overcome, but with patience, success is not only possible, but probable.[1]

Size of Problem.

Any estimate of the number of disabled men and the extent of their disabilities must be in the nature of a conjecture. We can only reach an approximation based upon the figures of another country passing thru the same experience. Turning to the Canadian statistics, then, we may make a rough forecast of the probable size of our own problem. In this process, we must make allowance at the outset for certain varying conditions and influences. For instance, early in the war, when fighting was less organized and was characterized by an abandonment and recklessness not now tolerated, many disabilities occurred which would now be avoidable. In Canada, also, large numbers of men over 31 years of age enlisted, thus tending to raise the age of the returned disabled soldier and make his vocational future somewhat less important. This is not to say that the future vocational life of the men in the thirties is unimportant, but that that of men in the twenties is over-

1—Page 11, Bulletin No. 15, Federal Bureau of Vocational Education.

whelmingly significant. The disabled soldiers of the American army will be almost all young men. Again, the more rigid medical examination which applicants for the American forces undergo tended to exclude many who under the Canadian conditions of enlistment would have been accepted and ultimately returned among the disabled group. We might roughly conclude in view of these facts, that the percentage of disabled might be slightly lower among the American than among the Canadian forces but that they would represent a youthful element in our population to whom a future productive life is of the utmost importance.

Canadian statistics show that up to April 1st, 1918, the Dominion had 34,000 soldiers returned. This represents about 7 per cent of the total number of enlisted men, about 500,000. Of the returned soldiers, 3,143 are under instruction for a wide range of occupations. It is a fair prediction to state, on the basis of these figures, that with a million and a half men in France we shall, in a period of three years, have about a hundred thousand returned men. Let us further suppose that, as in the case of Canada, about one-tenth of these men take the vocational re-education courses provided. This means a group of ten thousand men, for whom this method of return to civil life should be planned and organized.

It may be interesting at this point to compare casualties which occur in this country in our own industries with disabled or returned soldiers.

During the year 1917 there were 2,000,000 men whose accidents in industries caused them to lose time, in other words, pay. Seven hundred thousand of those men lost a period of four weeks or more. A total of 10,250 were among the dismemberment group, or permanent vocational loss of a limb. In one state alone, compensation was given to 50,000 men who suffered accidents, and in this same state there were officially reported 3,000 deaths due thru casualties in industrial organizations.

It would seem from these figures that a special study of vocational rehabilitation is timely. The experience and the knowledge which would be gained from the large focus which is at present being centered upon this problem by all belligerent countries should at the most reasonable moment include the re-education of disabled civilians.

For the extent of the disabilities of Canadian soldiers, I have taken the statistics given by Dr. James C. Miller, of Alberta, Canada. These were based upon the conditions of one thousand returned men to the Province of Alberta:

	Cases
1. Leg Disabilities:	
Amputation of right leg	11
Amputation of left leg	7
Limitation of movement of legs	180
Varicose Veins	21
Total with leg disabilities	219
2. Lungs and Pleura—	
Pulmonary Tuberculosis	85
Bronchitis	24
Gun shot wound in chest affecting lungs or pleura	33
Asthma	13
Asthmatic Bronchitis	10
Pleurisy and Pneumonia	7
Total lung and pleura cases	172
3. Arm Disabilities—	
Amputation of right arm	7
Amputation of left arm	7
Limitation of movements of arms	136
Total with arm disabilities	150
4. Foot Disabilities—	
Amputation of right foot	2
Amputation of left foot	62
Flat foot	21
Total with foot disabilities	85
5. Heart Action—	
Valvular disease of heart	42
Disordered action of the heart	25
Wounded in the heart	4
Total heart affection cases	71
6. Rheumatic Cases—	
Rheumatic fever	4
Rheumatism	40
Neuralgia	29
Total rheumatic cases	71
7. Abdominal and Pelvic Cases—	
Hernia	21
Wounds in Pelvic region	6
Wounds in Abdomen	37
Total abdominal and pelvic cases	64
8. Hand Disabilities—	
Amputation both hands	1
Amputation left hand	2
Amputation one to four fingers	15
Limitation of control of left hand	17
Limitation of control of right hand	25
Total with hand disabilities	60
9. Overage as Chief Disability—	
Total number of such cases	53
10. General Constitutional Weaknesses and Debility.	
11. Defective Vision—	
Total loss of sight	3
Seriously defective vision	41
Total sight disabilities	44
12. Defective Hearing—	
Total number of such cases	40
13. Neurasthenia—	
Number of cases	36
14. Kidneys—	
Nephritis	23
Wounded in kidneys	11
Total number of such cases	34
15. Shell Shock	31
16. Fraction of Skull	23
17. Wounds affecting the Spine	20
18. Gassed cases	18
19. Epilepsy and Hysteria	14
20. Wounds in Teeth and Jaw seriously affecting diet	9
21. Wounds in Neck	7
22. Facial disfigurement	6
Miscellaneous	23

It is clear that the number of returned men who will enlist for vocational re-education will depend very largely on when and how the knowledge of this opportunity comes to them. In all probability a comparatively large per cent of "Sammies" will avail themselves of retraining owing to the fact that general propaganda regarding the advantages of the work will be started far back in the hospital stage of treatment and convalescence. This will prevent much falling by the wayside of men who are eligible for training but need to be shown its value as a personal resource. In this respect as in many others, the organization of rehabilitation work in this country will profit by the experience of the other countries, especially Canada, which have been longer in the war.

Stages of Soldiers' Return.

In a discourse of this nature, it seems advisable to introduce some description of the successive stages thru which the private soldier passes after he has been disabled at the front. Those who are interested in his vocational rehabilitation will do well to remember that, up to the time when he went into action, his army service has not tended to develop initiative and responsibility. Fine as it is in many respects, this experience does not aid men to meet the complexities of work-a-day, civilian life. Add to this the emotional experiences of trench or back-line combat and you will realize that we have in the returned man, —first of all, a social problem; second, a mental problem in most cases amounting to a neurosis—nervous breakdown; and third, in the case of our special friends, a physical problem requiring surgical and medical care.

The wounded man receives attention, first of all, at a trench dressing station, where only first aid is administered. From here he goes to a field dressing station where careful examination is given, preventive toxins and antiseptics administered, and urgent operations are performed. He is next transferred to the base hospital where he receives thoro care and the deferred operation. The length of his stay here depends upon the degree of activity at the front—and the length of the daily casualty list. During drives and offensives the turnover, so to speak, of the hospital population is high and our wounded soldier is transferred again either to a convalescent home or a more distant hospital. Routes from the front lead backward along the lines of an opening fan.

It has been stated that the wounded men of the expeditionary forces will be retained in France for a minimum of six months. They will probably not be sent home unless it is definitely shown they can neither be returned to the fighting line nor to work back of the line. On each homeward bound transport there will probably be a member of the Y. M. C. A. "Cheer-up Squad," whose business it is to help the men, in addition to recreational activities, feel that they have *a place in the world to fill, and a work to perform.*

Distribution of Men.

The distribution of the men from the port of entry proceeds as rapidly as possible. The soldier feels at once that he has taken a definite step on his way back to civilian life and individual responsibility. With all deliberate haste the returned man is sent back to the military district where he was trained and which, in the majority of the cases, is near his home.

Should our soldier be blind, deaf, tubercular or a mental case, he is sent to an institution already established for treating these handicaps, thus, while he continues under institutional care, it has no longer the military stamp. It may be necessary to provide separate sanatoria for tubercular soldiers, as existing facilities may prove to be inadequate; but so far as possible civilian institutions will probably be utilized for the soldier's treatment.

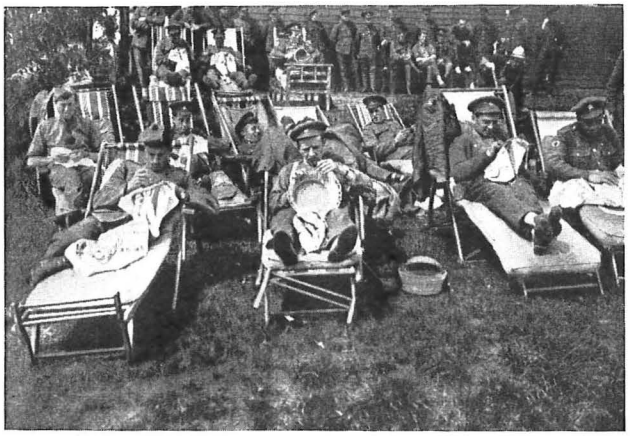
Let us suppose that the wounded soldier has now arrived in his own military district. What is the next step? First of all, in Canada in every case where the man's condition warrants it, he is given a ten-days' or two-weeks' leave to join his family. This seems only a human consideration. Before he leaves, however, the serious work of the vocational counsellor begins. The preliminary interview at this point need not be exhaustive, but it should be used as a basis for some correspondence with a man during his stay at home. Tho addressed to him, this correspondence is also for the benefit of his family. The soldier has heard of vocational training on shipboard and in the hospital, but to his family it may still be a new idea. The importance of enlisting the sympathy and support of the family for any plan of vocational re-education of the soldier can not be too strongly emphasized. The influence of relatives and personal friends necessarily plays a large part in determining the man's course at this critical stage of his life.

Hospital Occupations.

Perhaps our returned soldier was too ill for a leave and we find him in bed in a military hospital of this particular military district. He will be given what is variously referred to as bedside occupational work, occupational therapy, or ward occupations. This program is in the hands of the military authorities and altho there is no official connection there will be co-operative arrangements made with those in charge of vocational retraining. At this point, however, there will be a maximum of co-ordination of effort between the civil authorities having charge of the vocational reconstruction work and the army medical authorities having charge of the curative occupational work.

The benefits of bedside and war occupations may be listed as follows:

1. They divert the patient's mind and prevent his brooding over his handicap; thus stimulated by the sense of production which comes from work performed, he is able to learn again the art of hoping.



In one Canadian Military Tubercular Sanatorium during a period of six months after the introduction of light occupations twice as large proportions of the patients remained to complete their treatment.

He submits more contentedly to the medical treatment as the occupations help him "to stick it out."

In one Canadian hospital it was found that twice as large a proportion of the patients remained to complete their treatment during a period of six months after the system of bedside occupation was introduced, as compared with the previous six months without occupational diversion.

2. They function in the physical restoration of the patient. Mechanical occupations are prescribed for the retraining of atrophied muscles, the prevention of anchylosis, etc. In this group of occupations there may be classed also electrical treatments, hydro therapy, and massage, all of which function like an occupation in that they give the patient "something to do."

3. They develop character thru mental discipline in concentration, and thru the awakening of initiative at an early stage of convalescence.

4. They function as prevocational training, depending on the degree of co-operation between the vocational supervisors and medical officers.

5. They promote economy and expense by shortening the period of treatment.

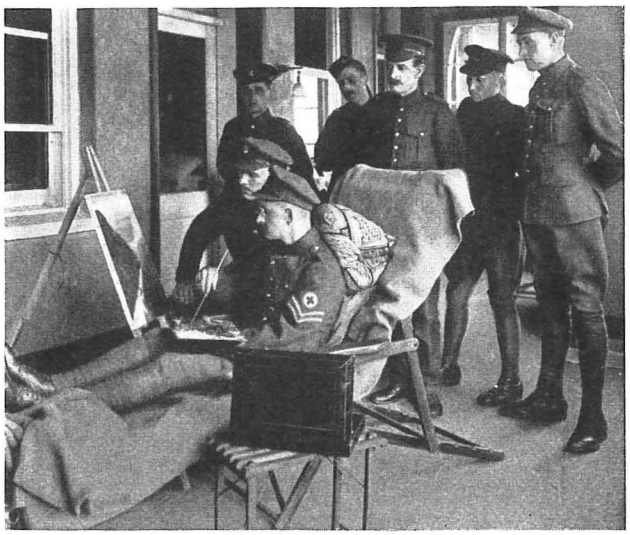
Owing to the large number of art teachers and craft workers in our country who are anxious to be trained as occupational therapy aides, this phase of the soldier's treatment should be made productive, both from the point of view of his recovery and that of the quality of his product. The stimulus and, consequently, the therapeutic value of work which consists of turning out good materials of appropriate designs and beautiful colors into craft objects needs no demonstration. The tendency of the hospital point of view in some foreign countries is to ignore the standards of workmanship and good taste in connection with the product. For instance, embroidery in colors is one of the chief resources of many bed-ridden soldiers. There seems to be no real reason why the articles thus produced should not be genuinely useful, if possible to the maker, beautiful in color and right in their color combinations, designs, and proportions.

The vocational education aides working with the doctors will best appreciate the prevocational values of subjects and occupations. They are acquainted with the industrial features of the civilian world beyond the hospital limits with which our soldier must needs be re-integrated by means of an occupation as soon as possible. If his bed-side work can be made to function in this direction much time can be gained for him. It is expected that as soon as he is mentally able the beginnings or related beginnings of his vocational career shall commence. A typewriter, a sounder, or a drawing board may be used while he is still in bed. If he is able to go to the curative work shop and spend time there according to the doctor's prescription, it is hoped that this may become prevocational training which shall later merge into his trade instruction.

The financial returns on good bedside occupational work have been demonstrated by the Canadian experience. There it has been found in one hospital that it may shorten the period of treatment in the case of tubercular patients by a month. If we estimate the possible saving on a group of ten thousand men we cut down the cost of ten thousand months which is equivalent to the treatment of over a thousand men for the full time. Allowing one thousand dollars for the cost per man, we calculate then a total saving of a million dollars. The cost of good bed-side occupational work would be more than made up for by this ultimate economy.

The Soldier's Discharge.

Somewhere along here a soldier's discharge from the army occurs and his entrance into civilian life takes place. The disabled soldier becomes a disabled civilian. He is no longer under orders. It is at this point that the vocational counsellor, backed up by expert medical advice and the helpful suggestions of an advisory committee, can be of inestimable service in the determination of a suitable vocation,—



It is not inconceivable that art may be a vocation. Soldiers, so disabled as to find it difficult to compete in modern trade conditions with normal men, may find that with training a satisfying and gainful livelihood may be had in the arts and crafts.

one which aims not only at self-support but at furnishing a worthy content for life.

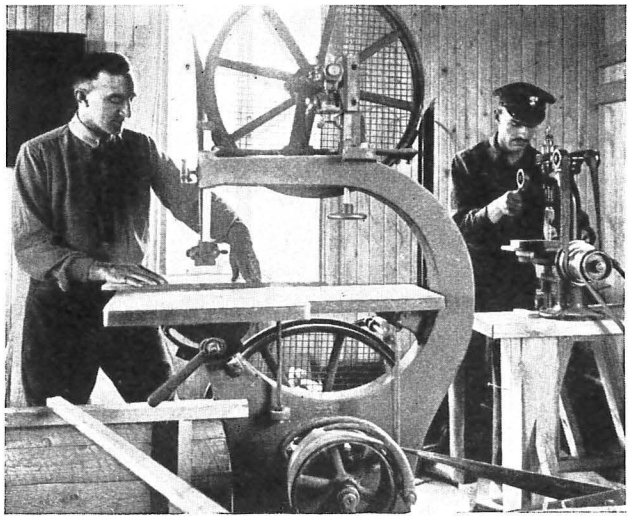
The vocational advisor must take into consideration a multiplicity of factors. We can not enumerate them all but at least the most important ones may be mentioned here. The personal qualifications of the man must include: (1) the nature and extent of his disability; (2) his previous occupation and wage-earning experience; (3) his age; (4) his previous economic condition and standard of living; (5) his bearing, manners, and personality.

On the other side of the problem, the counsellor must take into consideration the labor market, the equitable distribution of new recruits among the different trades, and the possibility of co-operation with the trade union by means of securing apprenticeship training for the discharged soldier.

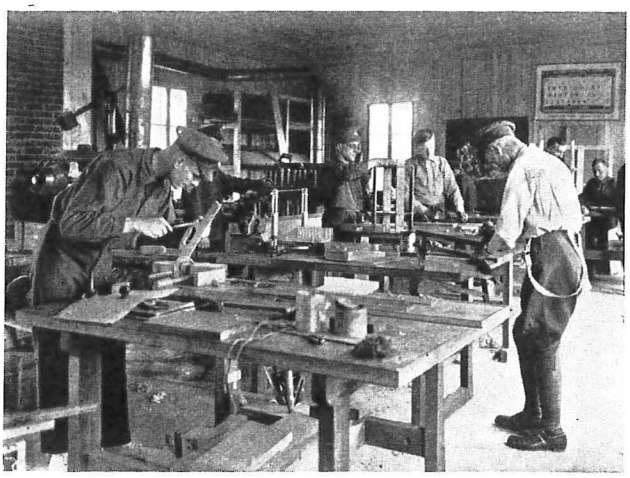
To quote an eminent authority on this subject, Dr. Douglas C. McMurtrie, "As the decision to undertake training at all must be voluntary, so must the choice of particular trade meet with the full approval of the soldier himself. And if, after beginning the course, the subject proves definitely distasteful, the opportunity to change to another trade should—within reasonable limitation—be permitted. It cannot be too strongly emphasized that the unwilling pupil is a poor learner indeed. In fact, in every respect, we must give the disabled soldier the best possible preparation for self-support. Let us discharge, to the highest degree, the nation's obligation to our wounded. Let us so act in this greatest of all wars as to mitigate the shame of their treatment in the past."[2]

Finally the vocational counsellor must take a long range view of the soldier's future. We have already pointed out that the American army is composed of our younger men. The disabled man, therefore, is not only to be so trained that his handicap affects him as little as possible and that he is able to earn the prevailing wage in the trade which he immediately enters, but he is also to be prepared to hold his own for many years to come in a given occupation. The future holds two especial dangers for him. He may in the first place, easily find employment for which he is not really suited but which is given him for sentimental reasons. This means that at some future time not far off, perhaps, he finds himself confronted by un-employment, a condition which has peculiar risks for him. In the second place, he must be prepared against that time some years hence, when the demobilization of the army crowds the labor market with returned men without disabilities. Unless the man with the handicap has proved himself actually productive at his trade in the meantime, he cannot maintain his foothold against the strenuous competition which must follow demobilization. The vocational counsellor therefore needs to weigh the possibilities of industrial conditions ten years hence in advising the disabled soldier who will be presently returned. He needs to consider that the disabled man must have extra training to gain an assured position in a trade. Such courses as will give the disabled soldier an additional insurance constitute the minimum training for him.

2 "Carry On," p. 67.



Vocational training is frequently therapeutic. It stimulates the patient to bend every effort to shorten his hospital treatment in order that he may get back into civilian life again.



In conjunction with most military hospitals there is a curative work shop. The training may be for physical restoration, it may function as prevocational measures, or it may be purely vocational.

Types of Vocational Schools.

In Canada, six types of vocational schools have been developed for the training of disabled men. It is from the experience of Canada that the authorities from our own country will largely draw. Their schools have grown up in response to the exigencies of the situation rather than on the basis of a preconceived plan. It is obvious that some one or more of these types would be better suited to conditions in this country than the others and that the early selection of the most suitable kinds would prevent much confusion and expense.

1. The vocational school or institution occupies the same place and is under the same management as the hospital and curative workshops. From the ward occupations the soldier passes over directly

into his vocational training. The vocational training shops may be separate from the curative workshops, and, in some cases, they are situated in another part of town away from the hospital. Institutions of this character are established in Tuxedo and Winnipeg. The disadvantage here is that the men are retained too long under a hospital regime. The combination of vocational training with boarding-in is not to be recommended for this country.

2. The vocational school is organized within an existing educational institution. It becomes a special school or unit, using the existing staff of instructors, the equipment, power, etc., by a co-operative arrangement. The policy and management of the school are agreed upon by the vocational training authorities, and the authorities of the co-operating institution. Examples of this type were observed at McGill University, the Toronto Technical School and Saskatoon Agricultural School.

3. The vocational school for disabled men is organized and provided with buildings, equipment, staff, etc., of its own. The Calgary Technical Institute is an example of this type. The chief difficulty with this plan is that under war conditions it becomes increasingly impracticable to build, supply and man a separate institution from the ground up.

4. The vocational school may be replaced by contracts and special arrangements with private schools, such as business institutes and normal colleges.

5. The vocational school may be replaced by special arrangements with employers to train and instruct men in their industrial plants.

6. The vocational school may be supplanted in some cases by special arrangements with trade unions for apprenticeship training.

7. Part-time vocational training in a productive school shop and part-time employment in the industries in combination.

The final plan—that of part-time training in a school on a productive shop plan and a part-time employment in a commercial shop or factory—has been suggested as suitable for our conditions. This applies for the great majority of cases, tho doubtless there will be many exceptions for whose benefit the other arrangements may be invoked as needed. If the army man of this country is to find himself ultimately established in a trade he must be trained for it by gradual steps. A school organized on the productive plan with unit courses and articulated with a shop organized for training seems to furnish the best type of vocational education that we have developed in this country. It is the most effective vehicle for conveying a man safely towards the goal of self-support and satisfying work.

The relative amount of time spent in school and in the shop is of the greatest importance. By far the greater part of the time should be spent in the school. If the plan allows for a ten-months' course, four-fifths of this could be profitably spent in the school and the remaining one-fifth in actual commercial shop work. In addition to this term, added provision should always be made for a return to the school. After the outside shop experience has been gained, the return would be for the purpose of acquiring proficiency in special work, such as expertness in operating machines not found in the particular shop where the man has been employed. His eligibility for further training would not be determined by himself alone but also by his foreman and the vocational counsellor who must have kept in touch with his progress. For this purpose the placement work of the vocational officer will be supplemented by follow-up work. Thus the man's first job becomes a try-out under the observant eye of the vocational guide. It may be noted, however, that in an educational productive shop he has already been under an instructor who himself has had long and varied shop experience and who has learned the art of creating a shop atmosphere within the school.

Experience has shown that the best teachers for vocational subjects are men who have been in industry and who have acquired the knack of real teaching and enthusiasm for it. The selection of teachers is one of the most vital and important phases of the vocational reconstruction work. Too much emphasis cannot be laid on this subject.

Emphasis will also be laid by our Government upon those responsible for administering this work in the various sections of our country. These men will combine wisdom, judgment, with sympathy and vicariousness. This fine balance must be maintained because the men must be taught on the one hand to resist the deteriorating influences, and on the other hand must not be subject to unreasonable discipline and impossible requirements. The problem is to strike the balance which will save the men. It is essentially a business—educational task, to be performed only by those who understand the principle of growth and who know how to use it by means of serving it.

Dr. Douglas C. McMurtrie well writes: "To such a program every American can heartily subscribe. And in its execution he must assist. The employers in their spirit of patriotism must give the returned man, not an easy berth, but a chance at a constructive job in which he can grow. The trade workers must suggest jobs in their own line which physically handicapped men can fill, and advise regarding the best methods of instruction to prepare for them. The individual citizen must help by his attitude to encourage the crippled soldier to the privilege of self-support rather than to the ignominy of dependence.

"America may have some physical cripples returned from the front, but she must have no social or economic cripples resulting from her participation in this war for justice and humanity."

HOW TO DESIGN POSTERS

John T. Lemos, Art Dept., Polytechnic High School, San Francisco

EVER since the cave men first chiseled their crude symbols on the cliff walls, we have had posters in some form or other.

Posters or picture symbols, as they might truly be called, are now an indispensable feature of our everyday life. The development of the advertising field has so enlarged their scope that no campaign is considered complete without posters.

In the poster class we have bill boards, car cards, window posters and poster stamps. In reality, they include a great many of our magazine page advertisements as well.

The influence of posters can be quickly seen by the manner in which the United States Government has relied upon them. Ever since our entrance into the war, we have been surrounded with posters. They have been constant reminders of our duty to our government and mankind. Uncle Sam has not underestimated the value of the poster. Stop now and think! You will be able to remember quite a number of war posters which have left an indelible impression on your mind, altho you may have forgotten the wording.

So important have our posters become that they are no longer left to be designed by our second and third-class men. Some of the best artists in the country have gone into this work and the result has been to put the poster art on a higher plane than ever.

In art schools, high schools, and even in the grades, there is hardly a better problem than the poster, for it includes drawing, color, and design. More than that, its field is limitless. It allows for the inventive idea, it has human appeal and can be put to practical use.

In planning a poster ourselves or in teaching the designing of posters, there are certain rules which, if adhered to, will bring us pretty close to a happy result.

We might put them down as follows:

1. The design should be simple.
2. It should have unity of wording and illustration.
3. It should tell its message effectively.

The first rule of simplicity is easy to understand when we realize that most posters are designed so as to be read at a glance and often at quite a distance.

Then if we plan a design which illustrates our idea in a simple manner, the eye grasps the picture quickly and without too much effort.

The tendency in first designing posters is to put in a great deal more than is needed. When a poster does not please you, try the idea of eliminating parts rather than adding more. The tones used should be broad and flat. The design itself should be planned so that its lines and areas will be pleasing even if executed in black and white only.

Our best poster artists have mastered this idea of simplicity. In their designs we find the illustration cut down to the fiber. Whole figures are shown in flat planes. Only those parts absolutely necessary to the correct understanding of the figures have been put in.

This method has been found unusually satisfactory because of the fact that the eye takes for granted many of the details we often painstakingly introduce.

The second rule of unity is always necessary to a successful poster. It is really based on design, without which no poster is a success.

A good poster will always be seen by the observer first as one complete unit and its subordinate parts later. Designs cut into sections which detract from one another are lacking in unity.

How often we see posters in which the lettering seems entirely foreign to the decoration both in location and character.

This is because the artist failed to think of his lettering as an integral part of his design. Good designers always consider the wording as an element which may be used to advantage in the "spotting" of their composition.

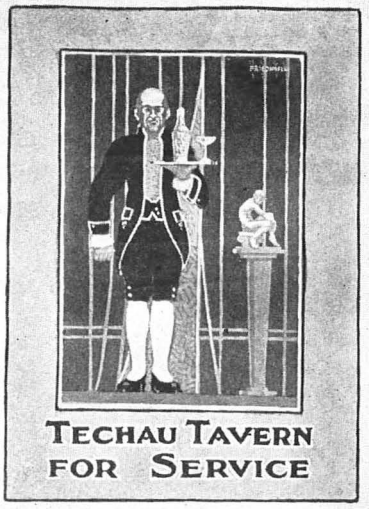
There is no better way of obtaining unity than by first planning your sketch in a miniature form, say, three by five inches or so. This helps to keep the design broad and simple. It also prevents the common failing of scattering the various parts of the design or of cutting it up into too many small areas.

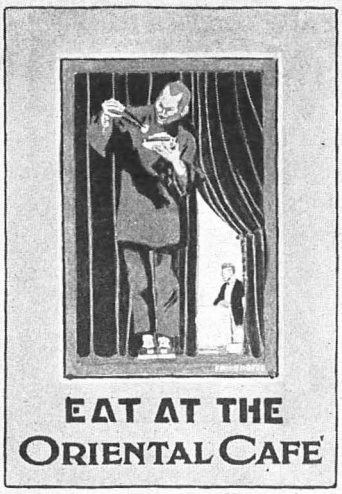
One method of producing unity is that of using a background of some harmonizing color, such as a blue gray or a deep brown. This color, running in back of the whole poster, has the effect of pulling together or uniting the various parts.

The third rule, "telling the message effectively," is especially very important. A very artistic poster might be a failure as far as its advertising power is concerned. Every year we see posters beautiful to behold but not effective at all. They do not perform their real mission in life, which is to *attract, please,* and *convince.*

To make a poster effective, we must first catch the spirit of the subject. Then we should try to relate our illustration so closely to the rest of the story that the two are inseparable.

Too often, we find the wording telling one story and the illustration another, with most disappointing results. A poster advertising a summer beverage should not give us the impression that it is announcing spring fashions.





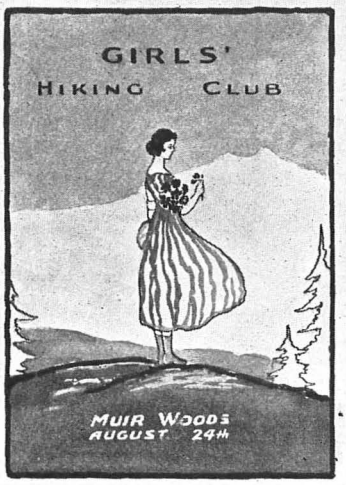
THREE POSTERS by HIGH SCHOOL STUDENTS showing good balance of Lettering and Illustration.

PRELIMINARY PENCIL SKETCH
Drawn to obtain an idea of Tone Values and Composition.

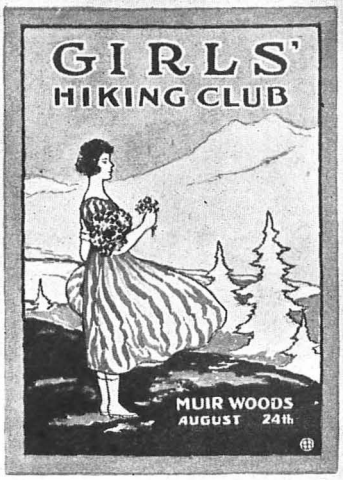
THE FINISHED POSTER
The colors used were Red, Gray, Blue and Black.

THE WORKING DRAWING
Made mostly in outline so that the plates may be painted by the Engraver to print the proper colors.

A poster having a fair design, but spoiled by poor arrangement of lettering.



One spoiled because both the figure and lettering are too small for the space they occupy.



An arrangement combining both good composition and strong lettering.

SOME PRACTICAL APPLICATIONS OF THE PRINCIPLES OF POSTER DESIGNING.

A good way to plan an effective poster is to read the material connected with the design, then select three words which you would use if you were to write an explanation of this subject.

For instance, in the food poster shown in the full page engraving, we have the ideas of food-patriotism and the message of conservation, all brought out by both the wording and the illustration. There is no doubt about the idea which the artist wished to convey.

Having decided what idea to put foremost in your poster, the next step is to plan it on paper so as to make a pleasing composition. Posters cut into many sections or having unimportant features too large on the page, are still quite common. Again, we find students who plan posters with their subjects too small for the space they occupy.

There are quite a number of rules for good composition, but a few very helpful ones are as follows:

1. Never have too many crossing or zig-zagged lines in your composition.

2. Avoid too many styles of letters or those so ornate as to be hard to read. Never have your wording read up and down like Chinese writing. This makes a poster hard to read.

3. Avoid "bunching" the heavy parts of your poster all at the top or all at the bottom. Keep the balance distributed.

4. Plan your poster so that it is not so divided as to cut it into two or three unrelated sections. This keeps your poster from being seen as one compact idea. A good strong border line or a background color will go a long way toward holding the composition together.

5. Last and most important, keep the tones of your poster *flat* and simple. Avoid modelling of surfaces. Our best posters are always those done in flat tones.

While these rules appear few, they in reality cover most of the failings commonly found in poster work.

Having gone this far, the next step we should consider is that of color. We find in color a force just as powerful as an electric shock or a siren horn. Color depresses or inspires to a remarkable degree. Artists, realizing this, use it to much advantage.

Such colors as yellow, tan, buff, and orange give life and cheerfulness. Reds and orange typify fire and enthusiasm. Greens and browns are restful and pleasant. Blues and blue greens have a tendency to produce coolness and restraint in a color scheme.

In first planning for color in a poster, it is good to remember that the best posters allow for brilliant contrasts of color. Posters without this contrast lack life and vitality. For this reason, such combinations as deep blue, medium gray and orange or violet brown, tan and deep yellow are always good.

A good way to figure out a color scheme for a poster is to first find out what the restrictions are as to the number of colors used. If the poster is to be engraved and printed, then there are generally restrictions calling for, say, four colors only or five colors.

A common question asked is as to whether or not these colors can be combined so as to make additional colors. As a rule, it is the safe plan not to count on such combination, as the technical limitations are such as to cause the engraver and printer considerable additional work in providing for these color combinations. Colors produced by overlapping of other colors mean extra work by the men who reproduce the original poster and hence mean a more expensive poster to produce.

This being the case, when asked to plan a poster to be printed in four colors, design your poster so that the effect is produced in four *flat* colors and no more.

In selecting these colors, it is best to plan for some cold and some warm colors to balance each other. For instance, a poster where yellow, red, brown and orange are used gives the beholder thereof a most uneasy and hot feeling. The minute a large area of a neutral blue gray is substituted in the place of, say, the orange color, then the whole poster shows a decided improvement.

Having picked out your colors, the next plan is to select the parts of the poster where these respective colors will be used. It is right here that most posters are made or ruined. A most useful rule to follow in deciding this is, "The larger the area to be filled, the softer or grayer the color should be; the smaller the area, the more pure or brilliant the color may be."

Read this over twice, and you will see that posters following this rule have the effect of sparkles of bright color set against the softer and more neutral backgrounds. Such posters are always attractive.

So far, we have taken two important steps in our color planning:

1. We have decided on using both warm and cold colors.

2. We have planned to use the brightest colors in the smallest areas and the softer colors in the larger areas.

Our next step is to select our colors and test them out. This is done by mixing the colors you decide to use and painting them side by side in little dabs in relatively the same proportion as they will be used on the poster.

For instance, if you are planning to use deep blue, blue gray and orange you would put down a little dab of orange, say, one-half an inch wide, then a dab of gray, maybe two inches wide and last a dab of blue, say, one inch wide. Let these colors dry and then hold them off at arm's length. In looking at them, you may find that the blue is too brilliant and needs a little red or black to deepen it and so on.

In this way, you can alter your colors until you have pretty nearly what you want. Having settled

this, you can then go ahead and mix up enough color for your poster and start to color it.

Pencil the design and lettering carefully on some fairly thick board. Do not select papers with a smooth shiny surface, as they will not take the color well.

Next purchase some opaque or "tempera" colors, as they are called, and with a flat brush lay on the various parts in absolutely *flat* tones. Do not try to obtain naturalistic modelled effects. This puts the painting out of the poster class immediately.

Opaque colors are suggested because they will produce smooth effects on large areas. Also, one color can be painted over another similar to oil paints. The colors should be put on fairly thick and not mixed with too much water, as this produces streaked effects.

It is a good plan to put in the largest areas first, as the remaining colors can then be adjusted so as to harmonize with this "key" color.

If the poster you design is to be the only one used, then it is displayed direct, but if many others are to be made from it, then it must be reproduced and printed. How this will be done all depends on those who are having the work produced.

In some cases, your poster is sent to a lithographing house where its various tones are reproduced on stone and printed on a lithographic press. This process is generally quite expensive, but very satisfactory.

Oftentimes, posters which are very large are reproduced by tracing the various parts of your drawing onto wood or thick linoleum. The wood or linoleum is then cut out and used on a press in a similar manner to an engraving.

If the poster is not very large, it is often reproduced by the photo-engraving process. If this method is used, you are generally required to make what is known as a working drawing. This drawing is done in pen and ink on any smooth surfaced paper. As you will notice, it shows in outline all the various parts of your poster.

This outline drawing is photographed and several prints made from it onto metal. These prints, in turn, are painted in with acid-proof ink so as to print the various colors desired. This "painting in" of plates is nearly always done by the engraver, who uses your poster as a guide. But it is always a good plan to consult with the printer or engraver and find out whether he wishes a working drawing for reproduction.

These rules and explanations, based on years of practical experience, are given with the hope that they may answer some of the questions so often asked by poster artists.

Poster designing is a fascinating art and the future holds much promise for enthusiastic students who can produce the kind of posters that will attract, please and convince.

THE USE OF THE TRIANGLES

Earl D. Gilbert, South Haven, Mich.

THE average student of mechanical drawing or the draftsman in the drawing room terms his two triangles as simply a means by which 30°, 45° and 60° angles or perpendicular lines may be drawn. Especially is this true of the student. The protractor, which in most cases is simply one of celluloid or amber, divided into degrees and half degrees, is relied upon for all other angles. With the use of a straight edge or Tee square and the two triangles 30-60 and 45 degrees, the circle may be divided into 24 parts of fifteen degrees each. Under no consideration should the triangles used for a problem be discarded for a celluloid protractor for the same problem, when it is possible to use them.

In the following plates are illustrated all the possible ways of using the triangles on the upper side of the Tee square, placed in the usual position on the left edge of the drawing board. There are 24 in all. It may be readily seen that there are many ways to determine the same angle and a few duplicates of the angles thruout.

For the convenience of all concerned, the angles are lettered in a clockwise manner. The positions of the triangles are shown dotted, the bottom edge of the lower triangle resting on a straight edge or

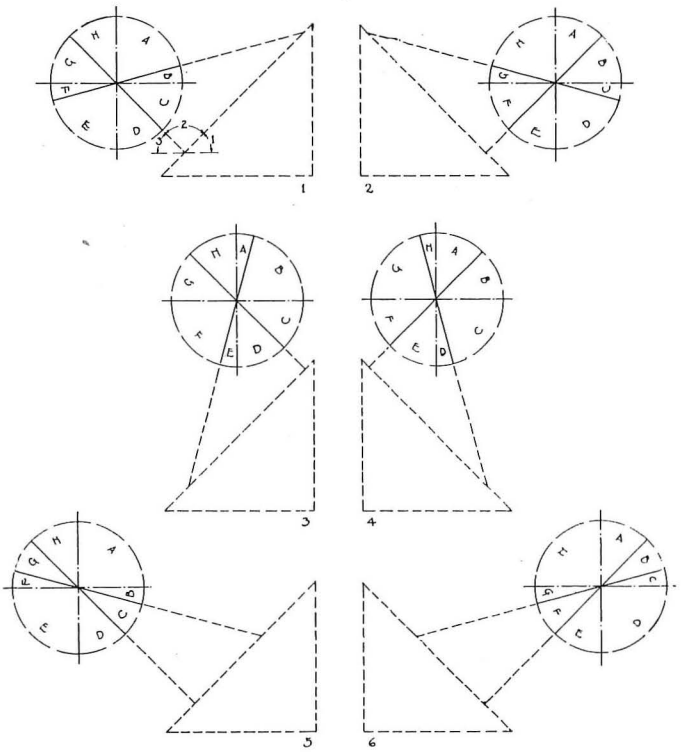


Plate I.

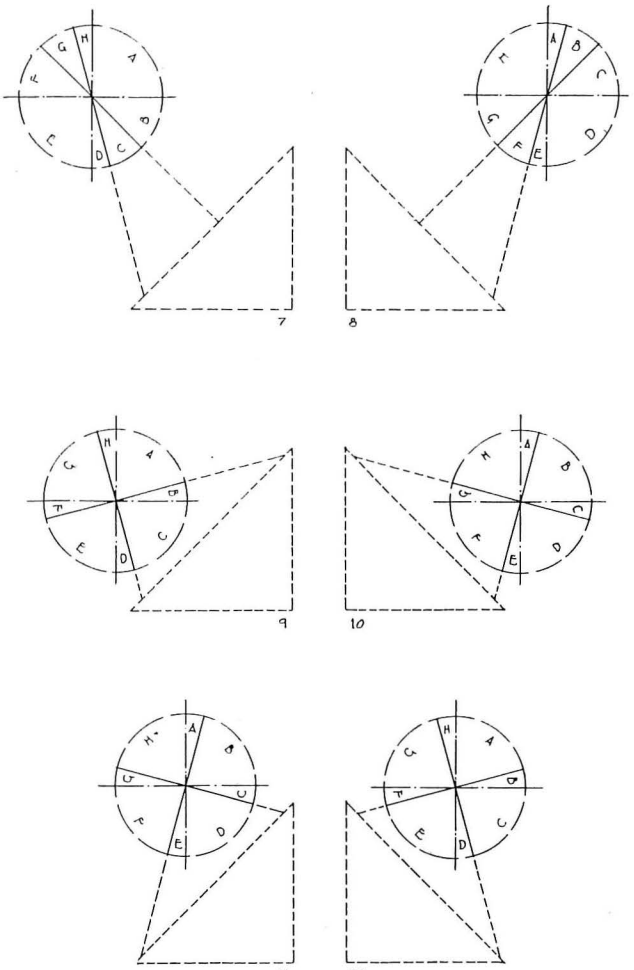


Plate II.

Tee square. A portion of the dotted line of the upper triangle is drawn full and extended for convenience, in order to determine the possible angles in that particular position.

The derivations of the values of the angles are simple. One case will be treated here. Other derivations are reached in a similar manner. The student or draftsman may, after choosing what seems to him the appropriate position for the triangles, verify his assumptions in a like manner. He must always bear in mind, however, that each division in degrees is never less than fifteen.

Fig. 1: Since angle 1 is 45° and angle 2, 90°, their sum would be 135°, leaving the value of angle 3, 180°—135°, or 45°. Therefore angles G, H, D, C, are each 45°. Since angle B+C equals 60° and angle C equals 45°, angle B then equals 15°. Therefore angle F is 15°. Since A+B equal 90° and B equals 15°, angle A would equal 75°. Therefore angle E equals 15°.

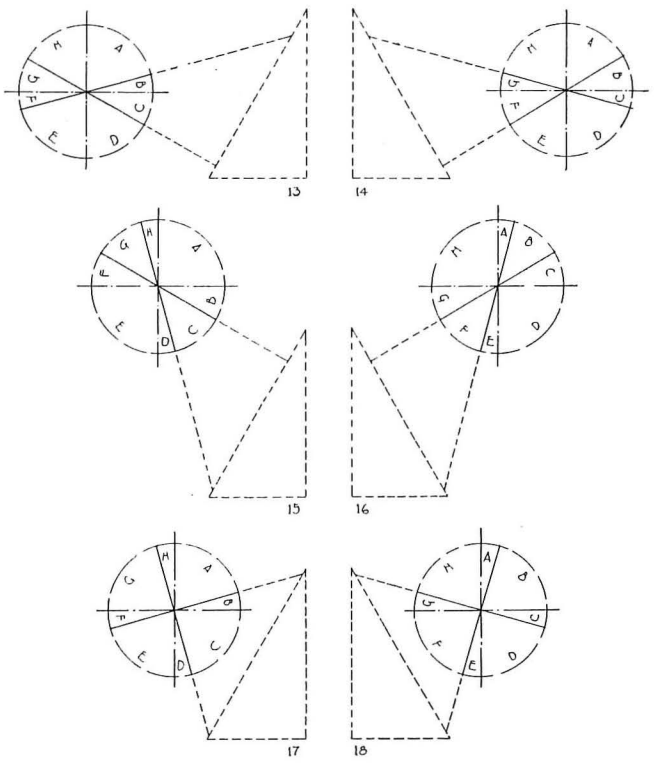


Plate III.

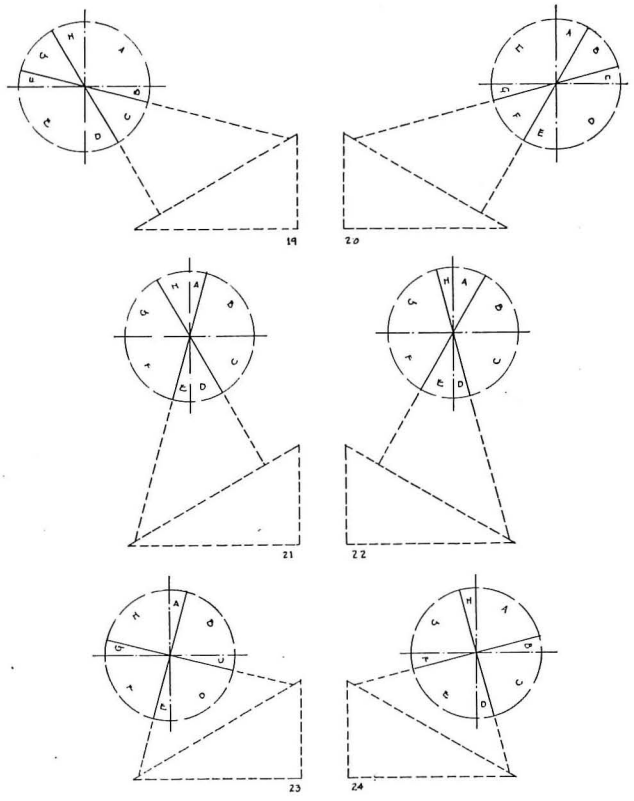


Plate IV.

EDUCATION is a better safeguard of liberty than a standing army. If we retrench the wages of the schoolmaster, we must raise those of the recruiting sergeant.

—*Edward Everett.*

The Teaching of Printing in the High School

Arnold Levitas, Instructor of Typography and Proofreading at College of the City of New York
and Stuyvesant Evening Trade School

OF all the trades taught in the school, printing has been found to lend itself best for the purpose sought. Not only does it serve to instil a practical bent into the mind of the boy, but it also has been found to be unusually helpful to him in his general academic studies.

The study of printing embraces the study of the most practical English known. It includes the study of mathematics and art. It gives the boy a comprehensive conception in practical application.

If printing is a valuable study in the school of elementary grade, it is doubly so in the high school. In the latter institution the boys are older and have had more education than in the former, and therefore the opportunities for practical results should be superior.

The value of the teaching of printing in the high school may be enumerated as follows:

1. It should eventually lead to a better understanding of printing matters by the general public, which will result to the advantage of the employing printer, the employee, and the consumer.

2. Inasmuch as the teaching of printing and typesetting develops a better and more practical knowledge of English, mathematics, and art, it is in that respect alone a useful element in the education of the young.

3. It has been found further that the work in the printing classes tends to give to the boys a taste for practical things, an opportunity for self-expression in the right direction, and a convenient and happy outlet for their energies.

The Aim.

The main aim of instruction in printing is to make it possible for the students to demonstrate their mechanical knowledge, their artistic ability, and their thinking capacity.

While the boys will get a certain amount of knowledge that should be helpful to them when leaving school and entering a trade, and while this knowledge will be particularly helpful to the boy who enters the printing trade, the direct expectation is that this training will materially contribute to their general culture and to the development of a practical bent useful in any walk of life—commercial, industrial, or professional.

Methods of Teaching.

It has been found to be of the greatest benefit to adopt the practical, or productive, method in the teaching of printing in the high school, as against the "purely pedagogical" method. For that purpose the classroom is to be regarded like a printing shop with its commercial spirit and atmosphere.

The work done in the class would all be used for one purpose or another. The boys would get there the atmosphere of the shop, the feeling of producing something for a purpose, the knowledge of working together for a certain general result and the harmonious fitting-in of every difficulty arising in the printing office.

It is not expected that the work produced in the printing class should be used for any purpose but that of the school, and particularly the class. While it is desirable that the product should eventually find a good place for usefulness (as only in that way could the proper enthusiasm and interest be aroused among the producers of a product), it is not good policy to create that commercial atmosphere of dollars and cents of the place which produces work on order for outside customers.

Perhaps the best illustration that could be given as to the kind of shop to establish for a high school is one that would be similar to the socalled "private plant," of which there are quite a few in existence. The printing shop of the publishing house is one that may be cited as an example.

The classes, based on this method, may be arranged so as to follow the administration of a regular printing office, and in that way serve to teach the students the production of work on an economic basis and also to give them some idea of executive knowledge.

The courses of study to be adopted should consist of subjects which are directly applicable to the running of such a printing plant; and one-third of the time should be devoted to the theory, in the form of lectures, and two-thirds to their practical application.

We shall assume that about 80 minutes per day are given to each group of students in the printing class. This would allow four different sections to occupy the classroom in close succession.

No more than fifteen boys should be taken care of in the class at one time. Each group will then continue the work where it has been left off by the one preceding it, and in that way keep at the job until completion.

If the boys are given two years, or four terms, of work, at the rate of 400 minutes (6 2-3 hours) per week, it would be possible to give them many of the subjects of the trade.

It is advisable, under these circumstances, to allow the class to govern itself so far as that is possible. The ablest of the boys should be appointed foreman. A sub-foreman might be chosen for each department — composing room, pressroom, stone, proofroom, etc.,—with responsibility to take active charge and to be held responsible for the equipment and material under his care.

Rotation of Work.

In order to insure to each boy a proportionate amount of time for training in each department of the work, a method of rotation should be adopted, and each student should go thru each one of the branches during each term, so as to become conversant with all of the processes. This method should be followed during the first two terms of each student's training. During the following two terms some of the boys should be ready to take charge of a department—assisting the newcomers as the latter are acquiring their initial training.

If the term is to consist of about twenty weeks, it might be arranged so that each student will get, during the first term, six weeks of pedagogical training in the elementary parts of the work. This will be followed by six weeks of composition, four weeks of press work, one week of distribution, one week of correcting, one week of proofreading, and one week of stone work.

This system of rotation could be extended the second term by eliminating the preparatory work of six weeks, so that the student's training in each department may be somewhat increased.

The preparatory training of the student would consist of learning the case, setting straight matter, learning how to correct and distribute, and getting a good knowledge of the equipment.

The diagram which follows gives an idea with regard to the system of rotation which might be adopted.

The Course of Study.

The course of study should consist of Practical Typography, Proof Reading, Planning and Layout, Office Work, Cost Finding and Estimating, Field Work, and Illustrated Lectures on Printing and the Allied Industries. It should be divided into four courses—one for each term—taking up the elementary parts the first year and continuing with the more difficult work the second year.

The courses may be enumerated as follows:

First Year.

Composition—
1. The Case.
2. Material.
3. Straight Matter.
4. Distribution.
5. Display Matter—Reprint.
6. Distribution of Display.
7. Correcting.
8. Setting from Manuscript.
   (a) Business Cards.
   (b) Letterheads.
   (c) Billheads.
   (d) Circulars.
   (e) Pamphlets.
   (f) Advertisements.

Stone-Work—
1. Locking Up for Small Press.
   (a) Small Jobs.
   (b) Two-Page and Four-Page Forms.
2. Locking Up for Foundry.

Press-Work—
1. Making Ready.
   (a) Small Jobs.
   (b) Pamphlets.
2. Feeding.
3. Mixing of Inks.
4. Paper.

Proofreading—
1. Proofreaders' Marks.
2. Galley Reading.
3. Advertisements.
4. Commercial Work.
5. Revising.
6. Page-Proofs.

Grammatical Lectures—
1. Punctuation.
2. Marks of Reference and Accents.
3. Capitalization.
4. Division of Words.
5. Abbreviations and Contractions.

Technical Lectures—
1. Proofreading.
2. Procedure in the Proofroom.
3. Rules and Methods.
4. Consistency of Style.
5. Consulting Reference Books.
6. Relationship of Words and Lines.
7. Computation of Space.
8. Construction of the Book.
9. Construction of the Magazine.

Typography—
1. Types and Type-Faces.
2. Harmony and Appropriateness.
3. Tone and Contrast.
4. Planning and Layout of Commercial Work.

Lectures with Lantern Slides—
1. History of Printing.
2. Making of a Magazine.
3. Making of a Newspaper.
4. The Printing Press.
5. Printing and Allied Trades.

Second Year.

Composition—
1. Tabular Work.
2. Composition with Cuts.
3. Make-Up on Magazine.
4. Commercial Display.
5. Magazine Display.
6. Borders and Ornamentation.

Stone-Work—
1. Breaking Up for Colors.
2. Imposition.
   (a) Hand-Fold.
   (b) Machine-Fold.
   (c) Color Forms.
3. Lining Up Sheets.

Press-Work—
1. Making Ready.
   (a) Halftones.
   (b) Large Forms.
2. Embossing.

Proofreading—
1. Stone-Proofs.
2. Press-Proofs.
3. Foundry Proofs.
4. Preparation of Manuscript.
5. Proof Criticism.

Grammatical Lectures—
1. Compounding.
2. Grammatical Structure.
3. English in Modern Typography.
4. Orthography.
5. Rules of Geographic Board.
6. Indexing.
7. Copy-Editing.
8. Editorial Reading.

Technical Lectures—
1. Electrotyping, Stereotyping.
2. Engravings of all kinds.
3. Lithography, Offset, and Letter-press Printing.

SECTION IV—2:30-3:50 P.M. **Distribution of Work** SPRING SEASON, 1918

NAMES OF STUDENTS	Feb 25 TO Mar 1	Mar 4 TO Mar 8	Mar 11 TO Mar 15	Mar 18 TO Mar 22	Apr 1 TO Apr 5	Apr 8 TO Apr 12	Apr 15 TO Apr 19	Apr 22 TO Apr 26	Apr 29 TO May 3	May 6 TO May 10	May 13 TO May 17	May 20 TO May 24	May 27 TO May 31	June 3 TO June 7	June 10 TO June 14
Bazil, M.	Foreman of Printing Department														
Sweet, B.	Sub-Foreman in Charge of Stone						**Sinderman, P.**	Sub-Foreman in Charge of Press-Room							
Hartman, D.	Sub-Foreman in Charge of Proof-Room						**Frasco, N.**	Sub-Foreman in Charge of Composing-Room							
Cohen, M.	Press	Proof	Case	Case	Press	Case	Case	Stone	Case	Press	Case	Case	Dist	Press	Case
Adickes, A.	Proof	Case	Case	Press	Case	Case	Stone	Case	Press	Case	Case	Dist	Press	Case	Press
Ferguson, H.	Case	Case	Press	Case	Case	Stone	Case	Press	Case	Case	Dist	Press	Case	Press	Proof
Poznikow, M.	Case	Press	Case	Case	Stone	Case	Press	Case	Case	Dist	Press	Case	Press	Proof	Case
Anderson, G.	Press	Case	Case	Stone	Case	Press	Case	Case	Dist	Press	Case	Press	Proof	Case	Case
Tubin, W.	Case	Case	Stone	Case	Press	Case	Case	Dist	Press	Case	Press	Proof	Case	Case	Press
Bloxberg, M.	Case	Stone	Case	Press	Case	Case	Dist	Press	Case	Press	Proof	Case	Case	Press	Case
Kenny, G.	Stone	Case	Press	Case	Case	Dist	Press	Case	Press	Proof	Case	Case	Press	Case	Case
Turk, R.	Case	Press	Case	Case	Dist	Press	Case	Press	Proof	Case	Case	Press	Case	Case	Stone
Beskind, M.	Press	Case	Case	Dist	Press	Case	Press	Proof	Case	Case	Press	Case	Case	Stone	Case
Bilyeu, K.	Case	Case	Dist	Press	Case	Press	Proof	Case	Case	Press	Case	Case	Stone	Case	Press
Basch, S.	Case	Dist	Press	Case	Press	Proof	Case	Case	Press	Case	Case	Stone	Case	Press	Case
	Dist	Press	Case	Press	Proof	Case	Case	Press	Case	Case	Stone	Case	Press	Case	Case
	Press	Case	Press	Proof	Case	Case	Press	Case	Case	Stone	Case	Press	Case	Case	Dist
	Case	Press	Proof	Case	Case	Press	Case	Case	Stone	Case	Press	Case	Case	Dist	Press

4. The Press, Rollers, Ink, Etc.
5. Paper.
6. Type.

Typography—

1. Printing for Advertising Purposes.
2. The Catalog.
3. The Book.
4. The Trade Journal.
5. The Magazine.
6. The Newspaper.

Cost-Finding and Estimating—

1. Finding the Cost.
2. Distribution of Burden.
3. Standard Cost-Finding System.
4. Preparation of Estimate.
5. Estimating Composition.
6. Platen and Cylinder Presswork.
7. Electrotyping and Stereotyping.
8. Engraving.
9. Ink.
10. Paper.

Studies in Administration—

1. The Composing-Room.
2. The Pressroom.
3. The Proofroom.
4. The Office.

Lectures by Experts—

1. The Printing Trade.
2. Advertising.
3. The Magazine.
4. The Newspaper.
5. The Trade Journal.
6. Paper.
7. Making of Type.
8. Making of Ink.
9. The Press.
10. Manufacturing and Commerce.

Field-Work—

1. Visiting Printing Offices.
2. Visiting Magazine Houses.
3. Visiting Newspaper Offices.
4. Visiting Electrotype Firms.
5. Visiting Type-Foundries.
6. Visiting Paper Mills.
7. Visiting Ink Factories.
8. Visiting Linotype Factory.

Equipment.

The equipment necessary for the purpose of teaching the course in question to best advantage include the following:

400 Lbs. 10-Point Body-Type (Caslon Oldstyle, for example).

80 Lbs. 8-Point Body-Type (same face).

80 Lbs. 12-Point Body-Type (same face).

3 Fonts each of 8-Pt., 14-Pt., 18-Pt.

2 Fonts each of 24-Pt., 30-Pt., 36-Pt., 48-Pt. (same body-type).

All the other type faces should, as far as possible, be of the *same family* as the body-type, and should include the following:

3 Fonts each of Italic (Caslon Italic, for example), 6-Pt., 8-Pt., 10-Pt., 12-Pt., 18-Pt.

3 Fonts each of Bold-Face (Caslon Bold, for example), 6-Pt., 8-Pt., 10-Pt., 12-Pt.

2 Fonts each of 18-Pt., 24-Pt., 30-Pt., 36-Pt., 48-Pt.

2 Fonts each of Bold-Face Italic (Caslon Bold Italic), 6-Pt., 8-Pt., 10-Pt., 12-Pt., 18-Pt.

2 Fonts each of Old English (Caslon Text), 8-Pt., 10-Pt., 12-Pt., 18-Pt., 24-Pt., 36-Pt.

2 Fonts each of Heavy Copperplate Gothic, 6-Pt. Nos. 1, 2, 3, 4; 12-Pt. Nos. 1, 2, 3, 4; 18-Pt. Nos. 1, 2, 3.

2 Small Presses—10x15 and 12x18, Paper-Cutter, Boston Stitcher, Proof Press, Imposing Stone, Padding Equipment, Cabinet for Specimens, Cabinet for Paper, Galley Rack, Chase Rack, Sticks of Different Sizes, Galleys of Different Sizes, Cabinet with Wooden Furniture, Cabinet with Reglets, Metal Furniture, Leads, Slugs, Chases, Ink—Black, Blue, Green, Red, Yellow, Paper—White, Colored Cover Paper, etc., Other Necessary Tools, Cans, Brushes, etc., Technical Works, Magazines, etc. The outfit to cost about $3,000.

The Product.

The work to be undertaken, and that which would be most fitted under the circumstances, would be the publication of a school journal, to consist of about 16 pages, and to appear once a month. At the same time various kinds of commercial work for the purposes of the school—such as blanks, stationery, circulars, etc.,—may be printed from time to time.

Another feature would be the printing of proverbs, poetry, and other work which would lend themselves to artistic treatment, ornamentation, and color.

The small work should be left mainly to the students of the first year, while the publication of the journal should be in the hands of the second-year students.

Perhaps the most interesting and most beneficial result of the opening of a printing class in the high school is the publication of the school journal. This should prove of great advantage in the academic as well as the technical and practical culture of the students.

The journal should be edited by the boys of the printing sections. *Contributions* may come from any member of the school; but the editorial staff and the reporters should be chosen from among those who are mainly responsible for its publication.

The work in getting up such a journal would bring into play every phase and opportunity of interest found in the product of the press and the product of the mind. It would stimulate thinking on concrete lines and develop thought in the proper direction. It would be a literary training as well as a training in good English and composition.

The boys would in all cases have in mind the object toward which they are striving, and would therefore do their work with enthusiasm and interest. They would be able to give expression to a variety of impulses, and would find there the greatest opportunity for an all-around intellectual and practical training.

This work would also bring in to play, from the technical point of view, every phase of typographic knowledge in the most comprehensive and practical manner and would at the same time give the students some insight into the journalistic field.

MURAL DECORATION IN NEW YORK CITY SCHOOL.

A TENONING MACHINE FOR THE SCHOOL SHOP

Joseph J. Eaton, Director of Industrial Arts, Yonders-on-the-Hudson, N. Y.

IN these days when teachers of shopwork are seeking opportunities to place their work on a productive basis many aids to the pupils are introduced which would have been thought unwise a few years ago. However that may be, the writer presents an undertaking that has proved useful in the development of skill in its making, as far as one shop is concerned, and highly desirable as an aid to quick and accurate production in another shop.

This project or machine is a device for cutting tenons. The idea is not really new, altho it is entirely the invention of one of the former teachers of the Saunders Trades School, Yonkers, N. Y.

Working drawings, photographs of a machine in use showing some of its possibilities, and a complete description of the operation of the machine, are submitted below. Any one desiring to make this machine is at liberty to do so, for it is not patented. Any school which performs work on a commercial basis might find it profitable to modify the drawings and place the machine on the market, for it is not a "school shop" machine in any limited sense.

Of course it does not eliminate the circular saw as a machine for cutting tenons, where many duplications are desired or for large tenons, but it has many advantages that the circular does not possess. The principal one is that it may be operated by the youngest and smallest pupils without danger; also adjustments are easily made so that a large variety of sizes may be cut by different pupils; it is operated by hand, thus eliminating the power question; and as little space is required, so it can be moved from one part of the shop to another.

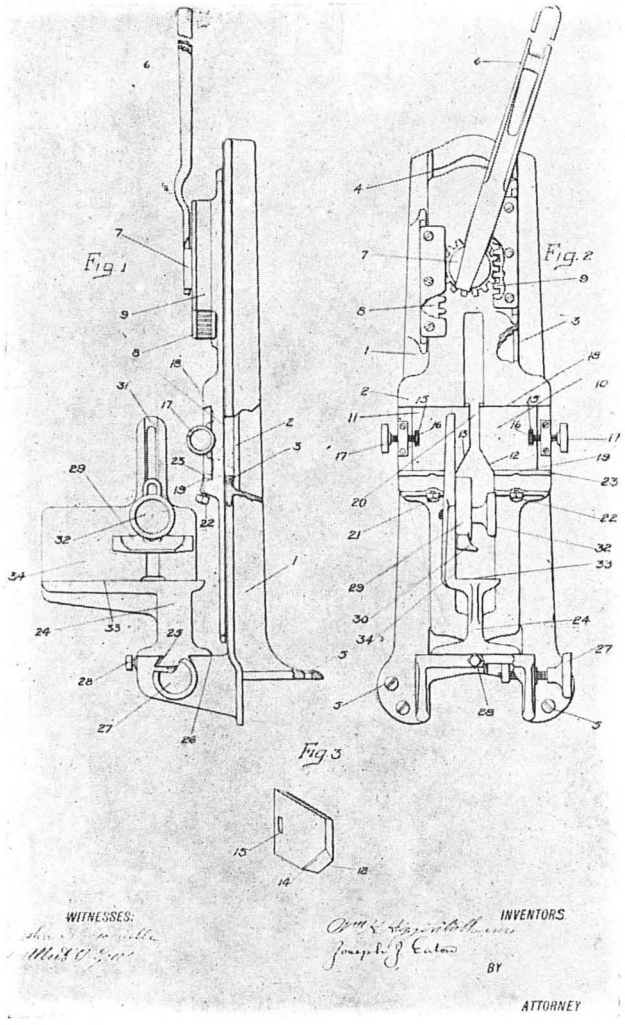
As some people may be interested in the development of this machine a short sketch is given here.

The teacher of cabinet making was requested to have made twenty desks for the use of classroom teachers. As is usually the case, the tenons were cut on a circular saw in the regulation way. However, as few pupils were permitted to use the saw the work developed a sort of specialization. At this time the idea occurred to the teacher to rig up some sort of a device with movable cutters so that each pupil might perform some of the work. A wooden frame was made to hold a steel cutter, and a second frame of wood was made to permit a vertical motion of the first frame. With a long lever the movable frame with its cutter was operated as designed.

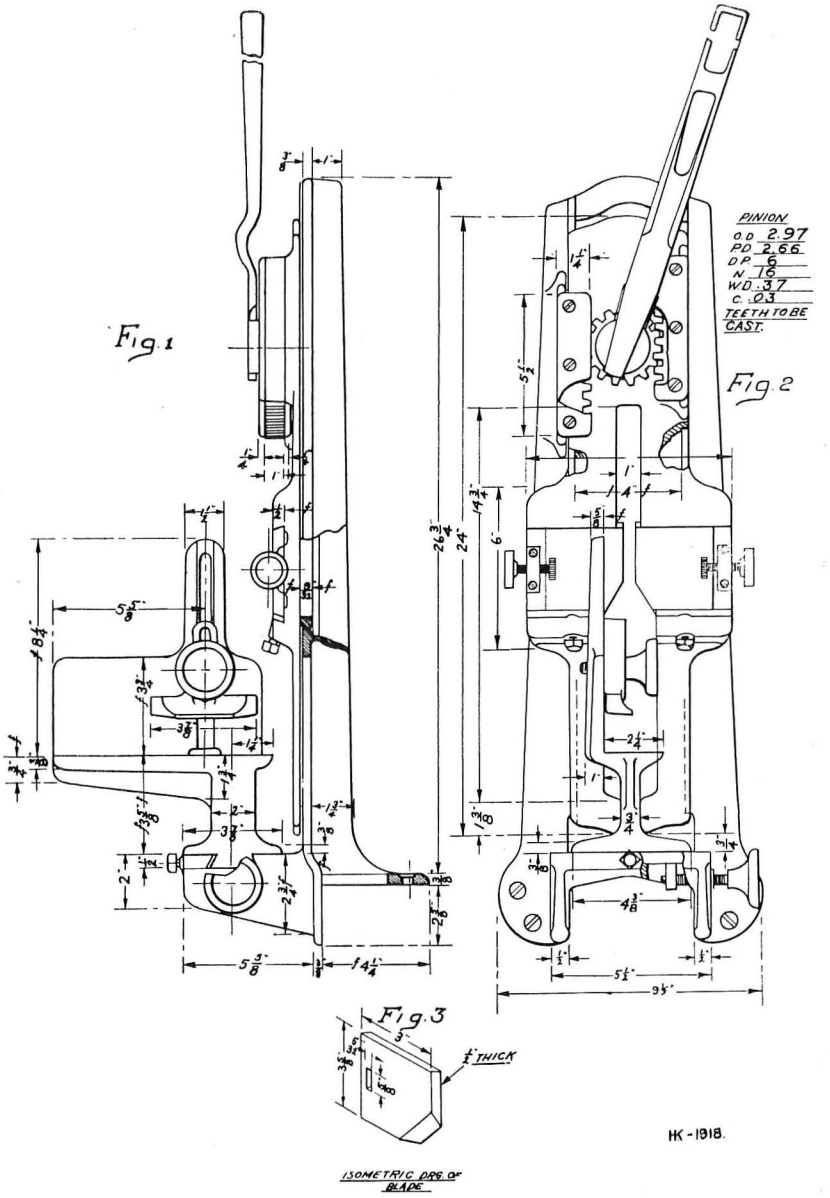
This did not prove satisfactory because the form of cutting action forced the cutter away from the part to be cut. A second cutter was then introduced in a modified frame with better results. However, the frame was not rigid enough to prevent a considerable amount of springing or spreading of the cutters. Besides this the whole affair was large and cumbersome. This wooden machine showed that the basic idea was correct and apparently worth while. So from this point on an all metal machine was developed.

As has been stated, this machine is especially designed and adapted to cut tenons of varying widths and thicknesses. To obtain these results the machine is provided with a frame, a sliding carriage containing two knives, an adjustable clamp to hold the wood to be cut, and a mechanism for imparting a reciprocating motion to the sliding carriage. Provision is made for adjusting the relative positions of the knives for the purpose of obtaining cuts of different thicknesses, and provision is also made for the accommodation of pieces of wood of different sizes and for the proper adjustment of the wood for cutting.

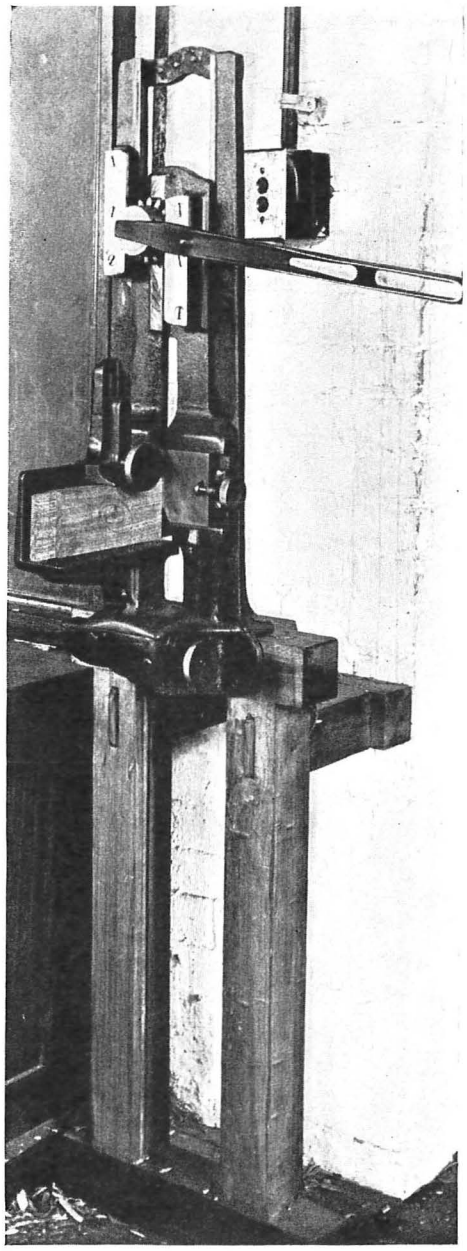
The machine is designed to cut tenons ranging in thickness from one-eighth of an inch up to two inches, and in width from one-half inch up to eight inches. This form of machine is arranged to be fastened to a bench or to a table, altho it may be constructed so that it may be fastened to a post, to a wall, or to a special frame. It is also designed to



Patent Office Sketch of Tenoning Machine.



Details of Tenoning Machine.



The Completed Machine.

be operated by hand, altho it may be arranged to be operated by foot power.

To make the whole idea clear the drawing is numbered as in a patent office drawing.

Frame 1 supports and guides carriage 2 in ways 3 and 4. This frame may be fastened to a table or bench thru holes 5, 5.

Actuating lever 6, moving in an arc, turns pinion 7. (This is a standard pinion which may be purchased if the machine shop is not fitted to cut it.) As pinion 7 meshes in racks 8 and 9, and rack 8 is an integral part of frame 1, it will have a reciprocating motion imparted to it when the lever is moved forward and backward.

Rack 9 is an integral part of carriage 2, and the latter has two adjustable knives, 10 and 11, firmly attached to it. Thus a forward and backward motion imparted to the lever will impart a reciprocating motion to the knives.

The oblique cutting edge of knife 10 is shown at 12 and a similar edge of the other knife at 13. In figure 3 is shown a complete knife with like numbers.

By turning hand screw 17, disk 16 in slot 15, imparts an inward or outward motion to the knife, which is free to move laterally in ways 18 and 19. By a similar mechanism for knife 11 the space between the two knives at 20 may be closed or opened to the limits of the machine, in this design a matter of two inches. The width of the opening 20 determines the thickness of the tenon to be cut.

The distance moved by carriage 2 is limited by the length of rack 8 in its relation to the pinion and other rack, and this distance represents the limits of width of tenon which is cut; in this machine, eight inches. Bolt 22 may be screwed against gib 23, thus locking the knife at desired positon. A similar bolt, 21, performs a like service for the other knife.

Stand 24 slides in dovetail way 25 on table 26,

The Tenoning Machine in Use.

an integral part of frame 1. The movement of stand 24 is limited in direction by way 25 and obtainable thru hand screw 27. Stand 24 may be locked in any position by lock bolt 28 in similar manner to that employed in locking knives 10 and 11.

Adjustable clamp 29 with oblique face 30 slides in slot 31. Clamp 29 may be locked at any point by hand screw 32.

To cut a tenon the operation is as follows. The space 20 between knives is made equal to the desired thickness of tenon to be cut. This is done thru hand screws 17, 17, and it would be preferable but not necessary to have this space equally divided with respect to the center line of the machine. The knives are then locked in place.

The piece of wood to be cut is placed on surface 33 and against surface 34. Clamp 29 is dropped into place and locked. The wood may be moved under the clamp but only in a path perpendicular to the cutting plane of the knives.

Hand screw 27 is then turned, moving stand 24 until the wood to be cut occupies the desired position with respect to its location to the plane passing perpendicularly thru the center of space 20.

The end of the wood, upon which tenon is to be cut, is moved until one-fourth of an inch, more or less according to the size of the tenon and the variety of wood, extends back of the cutting plane. With a suitable movement of lever 6, the edges of the knives will cut across the grain of the wood on both sides of the tenon to be formed. At the same time the shoulders of the knives will strip off the short grained portions of the wood thus released. This will form a portion of the tenon about one-fourth of an inch long but of the correct thickness and width.

The knives are then brought back to the original position and the wood is moved forward again and the operation repeated until all of the desired portions have been removed and the tenon completely formed. The last cutting operation finishes the tenon ready for use, with clean, square shoulders.

By adjusting stand 24 tenons may be cut that are not centrally located. Lap joints may also be cut if the stand is moved to one side of center a sufficient distance.

WAR PROBLEMS FOR THE GRADES

The INDUSTRIAL-ARTS MAGAZINE has just arranged for the publication of a series of war problems for shop classes, sewing classes and art classes in elementary schools. The authors are *Miss Bonnie E. Snow* and *Mr. Hugo B. Froehlich.* Both these writers are so well known that commendation here would be superfluous. The war work which they have prepared is new and original and will provide material for shop and class work of the most practical type. It will be timely and highly educational.

GETTING A GOOD START IN SEWING

Janet G. Cation, Iowa State College

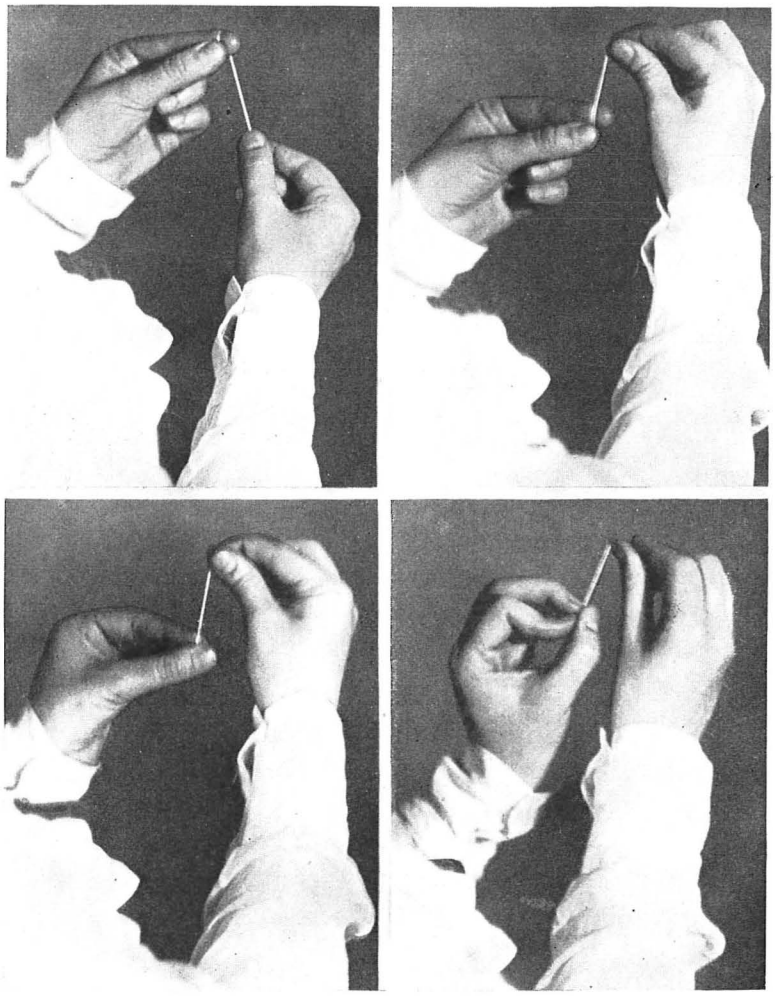
PERHAPS you have recently learned to knit. You may have been taught by an experienced knitter who said, "You hold your work like this," as she skillfully winds the thread around her finger, "and start in like this." "Like what?" you remark. "Don't go so fast, I can't do all of that at once." The fact is, she is doing several processes altho they are so mechanical that she does not realize it; consequently you cannot grasp them all at once.

Do we not as sewing teachers often make the mistake of giving more in the first lessons than a child can possibly comprehend? Notwithstanding the fact that the small needle is difficult to thread, and that the thimble seems large and awkward, we give material to the child and tell her to sew.

If the child has sewed she has probably pushed the needle with her thumb and first finger and sees no reason why she cannot continue to do this. Analysis of the process, however, shows us that, with this method, there is an exertion of the whole arm, while, when the needle is held between the thumb and first finger and pushed with the thimble this strain is avoided.

It is well, then, that our first efforts should be to establish right habits.

The best way to teach the use of the thimble is to concentrate on that for a few minutes at the beginning of each lesson, until the habit is acquired. Do not bother the child with thread or cloth, but give the following drill with only needle and thimble:



STEPS IN KNOT DRILL.
(Left to Right) Above, Steps 1 and 2; Below, Steps 3 and 4.

Thimble Drill.

Put the needle in position. Push it slowly with the thimble. Have the child push it while you count five. Have her push it in ten counts.

Continue the drill until the child can push it evenly, not jerkily. You will be surprised at the good results this brings after a few days' trial.

Knot Drill.

Altho knots should be used only for temporary stitches, it is well to teach children to make them quickly and neatly.

Try this drill, letting the girls do the four processes to four counts.

Needle and Thimble in Position for Thimble Drill.

1. Hold the end of the thread between the thumb and first finger of the left hand.
2. Twist the thread around the finger once.
3. Twist the two threads, fringing the loop off the finger.
4. Bring the knot down to the end of thread.

Speed Drill.

Rowe, in his book, "The Physical Nature of the Child," suggests a splendid game to test the swiftness of fingers. "See who can make the most crosses, the most horizontal lines, the most vertical lines in ten seconds."

This enables the teacher to find out those who get started last, and who are always slow. If she sees to it that these people are helped first, she will do a great deal toward keeping her classes uniform.

Nothing goes so far toward the success of the year's work in sewing, as getting a right start. These little drills, altho they seem trivial, are most helpful in overcoming some of the obstacles which teachers must often battle for many months. Try them with your beginning classes.

Suggestions for Teaching Working Drawing

Harold E. Taylor, Paterson, N. J.

IN presenting this brief discussion of some of the ways and means which may be employed to aid the student of working drawing, I have in mind two types of teachers. Both of these types are to be found, particularly in our larger cities where prevocational training along industrial lines has been organized.

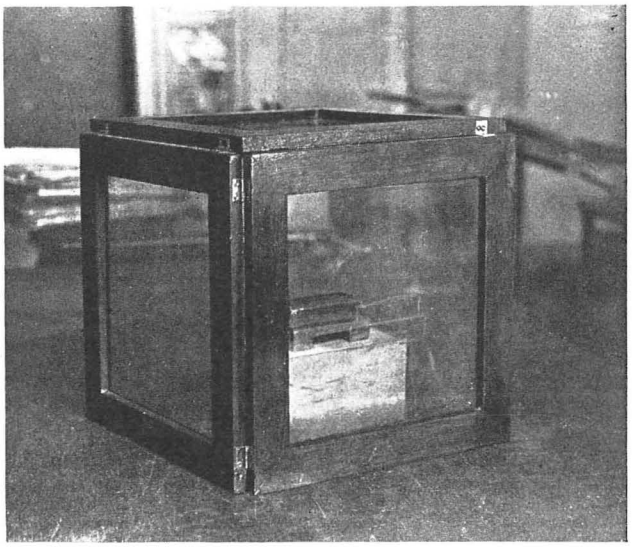
First we have the academically trained man or woman who has been assigned to teach drawing in a school where departmental work is the order. This teacher may or may not be well grounded in the theory of orthographic projection but naturally he will view the work from an academic standpoint and can hardly be expected to grasp the relation of this work to real practical drafting room demands.

Then we have the practical draftsman who has entered the teaching profession from the trade. For him the visualizing of an object from a drawing has become so much a matter of second nature that he has difficulty in appreciating the difficulties which beset the path of the novice.

For both of these teachers a close analysis of these difficulties is the only help, and in this article I shall try to present something in the way of selecting teaching material and arranging a sequence of work that will be useful.

In the prevocational schools of New York, pupils enter this industrialized curriculum at the seventh grade, if they so desire, with some preliminary training in handiwork and drawing. In the drawing room they should be constantly impressed with the idea that only work which is neat in appearance and accurate in measurement is of any value, and in order to secure this neatness and accuracy on the working drawings it will usually be necessary to precede them with some plates giving practice in the various ways of manipulating the instruments, and with simple geometrical problems and freehand lettering. Most of the geometrical drawing, such as the bisection of an angle, the division of a line, construction of a hexagon, etc., I have found best to present in project form. In the abstract it will be found very uninteresting subject matter to the average boy.

This general outline covering working drawing is adapted from the New York City Superintendent's report of March, 1917, on the "Organization and



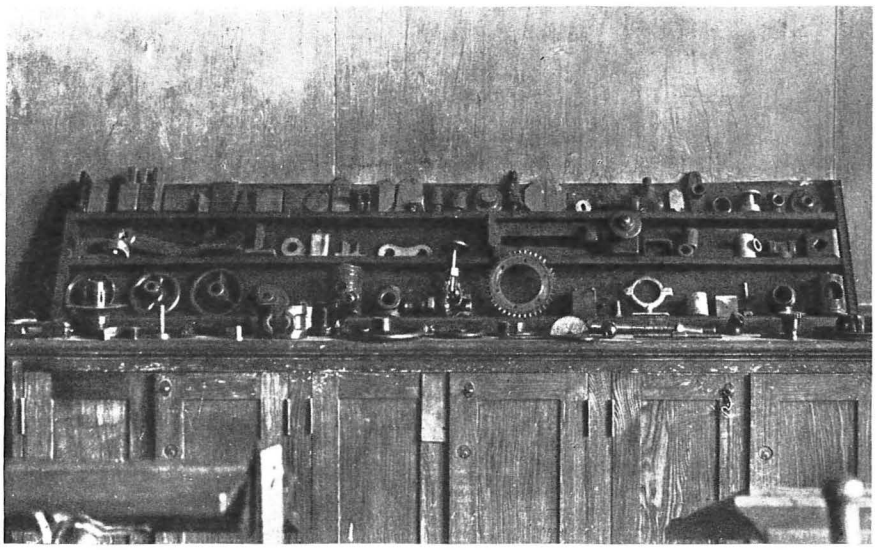
Finished Light Box. (See Drawing Page 346).

Extension of Prevocational Training in Elementary Schools." For convenience I have numbered the groups.

Group I—Rectangular Solids, Visible Lines.

Group II—Oblique Solids, Visible Lines.

Group III—Rectangular and Oblique Solids, Invisible Lines.



Projects used in the Author's Drawing Classes.

Group IV—Solids Involving Circles and Arcs.

Group V—Cross Sectional Views.

Group VI—Thread Conventions.

This outline is most workable when followed in what we might term the spiral method. That is, from simple models in group I to simple models in groups II and III. Group I may then be reviewed with more difficult models or with projects which begin to lead the student away from directly following a group outline, as it enables the teacher to develop a certain principle which may then be applied by the entire class, slow pupils being assigned easy examples and more apt pupils the difficult ones.

To the average boy of prevocational age, drawing and particularly projection drawing is a somewhat abstract subject. It devolves upon the teacher to give him a concrete basis for his reasoning and then to gradually lead him away from the necessity for models and develop his visualizing sense until he can see the model in his mind's eye from an incomplete drawing or from a written description.

Fig. I shows two of the drawings used over and over to acquaint the student with the conventions and method of projection drawing. Copies of these drawings are given to the class and they are asked to select from other drawings in the room or from books similar conventions, such as center line, dimension line, object line, etc. The three views and the perspective are compared with the model and pupils asked to sketch the views without the aid of the drawing.

The method of laying out the working drawing is then taken up, covering blocking in lines, center lines, object lines, extension lines, dimensions and dimension lines.

The pupil should now be ready to begin actual work on a simple mechanical drawing and he may start with a plain parallel-faced block or with any object in group I which he is able to do. For this work a hinged box with glass sides, such as shown in the photograph and drawing, Fig. II, on which he may sketch the projections with a wax pencil, will be found a great aid to grasping the idea of three planes of projection. When the views have been sketched on the glass the sides may be opened out flat and by adding the necessary extension and dimension lines we have a reproduction of the working drawing. This sketch should be transferred to the pupils note-book and the mechanical drawing done from that, referring to the model when necessary.

Groups I, II, III should be covered in this way from the model, the teacher frequently supplementing the model with a blackboard perspective to familiarize the student with this means of representation. These should be drawn at first so as to show the three sides which will be represented in the working drawing, i. e., top, front and right side. Next these groups should be reviewed depending entirely on perspectives. If this proves too difficult at first the teacher may supplement the perspective with a plan view or perhaps a front elevation, requiring the student to complete the other views. Or, for the more backward pupils the three views may be drawn to a reduced scale, requiring them to be redrawn full size to dimensions given on the perspective.

Now the arrangement of the perspectives may be changed slightly so as to show top, front, and left side and the student required to draw the same views as before.

When groups IV, V, VI are reached the pupil should be able to dispense entirely with the light box and readily draw three views of an object in their proper relation, altho from this stage two views only will be required of most models. Groups IV, V are studied by drawing first from the model, objects being actually cut in half for the first cross sectional drawings, then from perspectives and illustrations in catalogs and magazines. Particular care should be taken to make the representation of cross sectional views as clear to the pupil as possible. The objects are cut on an axis of symmetry at first and complete cross section views taken. Then a half outside and half sectional view may be combined. Next a sectional view of an arm pulley is compared with the same view of a web pulley and the pupil led to see

the reason for omitting the section lines in the arm. When the revolved section has been explained in connection with this or a similar drawing and the object of broken views made clear, that is about all that need be said on the subject of cross sections. Of course this can not be presented in consecutive lessons. Each of these principles will have to have many illustrations, for the tasks of leading the student to the point where he can take a rather difficult model and imagine a quarter section cut out so as to combine a cross sectional view with an outside view is a slow process. I have abundant evidence that it can be done with boys of elementary school age if the teacher will be both patient and persistent.

It is not expected in a course of this type that more than conventional representation of threads will be attempted. This does not debar presenting certain definitions which are used constantly in connection with threading such as outside diameter, root diameter and pitch. The pupil is made familiar with tables of U. S. standard bolts and nuts and is given practice in drawing them, using dimensions taken from the table. The important points to be considered in conventional representation of threads are, right and left-hand threads, tapped and clearance holes, tapped holes shown in cross section and drawing of square and hexagonal head bolts and nuts. Most of this can be presented by means of large bolts and nuts and drilled and tapped pieces in connection with the table mentioned above. When we consider that the work in drawing is carried on in connection with various kinds of shop work such as machine shop, electrical wiring, woodwork, etc., the necessity for having as well rounded a course in drawing as possible is apparent. Many models in each group can be taken from shop projects, or from some detail of these projects. Often a project involving several detail drawings can be handled with a group of boys.

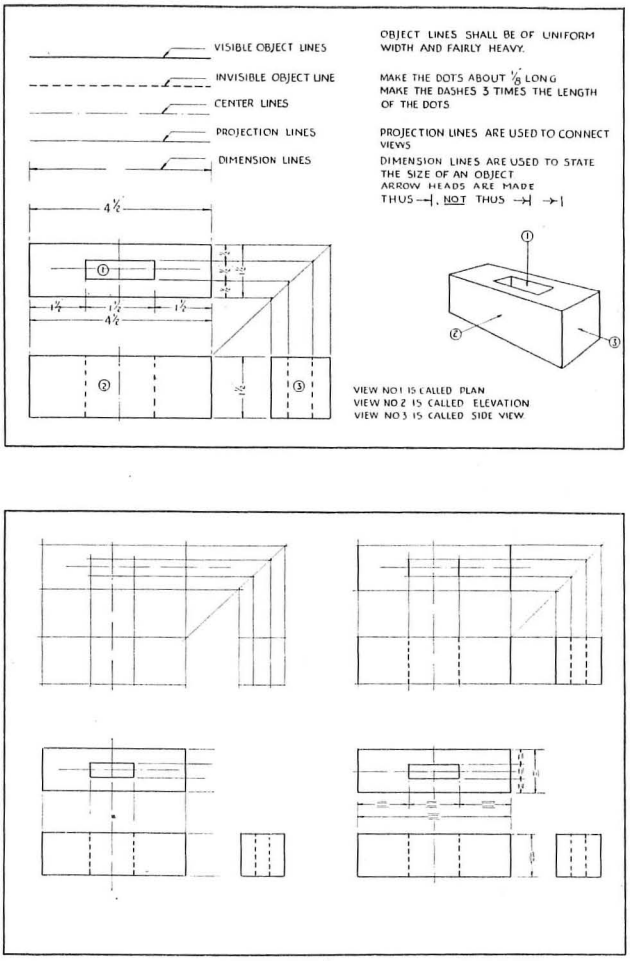


Fig. I. Plates Used in Teaching Conventions.

Certain boys in the elementary stages of the work may be assigned to some detail which would be classified under group I or II and the more advanced boys details which require cross sectional views and thread representation. Here a too rigid classification as to groups would be very unwise and the boy, if interested in the project, will often go far in advance of his natural progress in the logical outline.

By carefully applying the group outline given above to projects which have proven a stimulus to the boy's interest it is possible in the two years of prevocational schooling for him to acquire an excellent insight into the elementary principles and practice of the draftsman's art. Even should he not follow drafting further as a study he will, in the majority of cases, enter some mechanical occupation. Thus the knowledge of plan reading and of methods of laying out work which he has acquired in the drawing room will be of inestimable value to him.

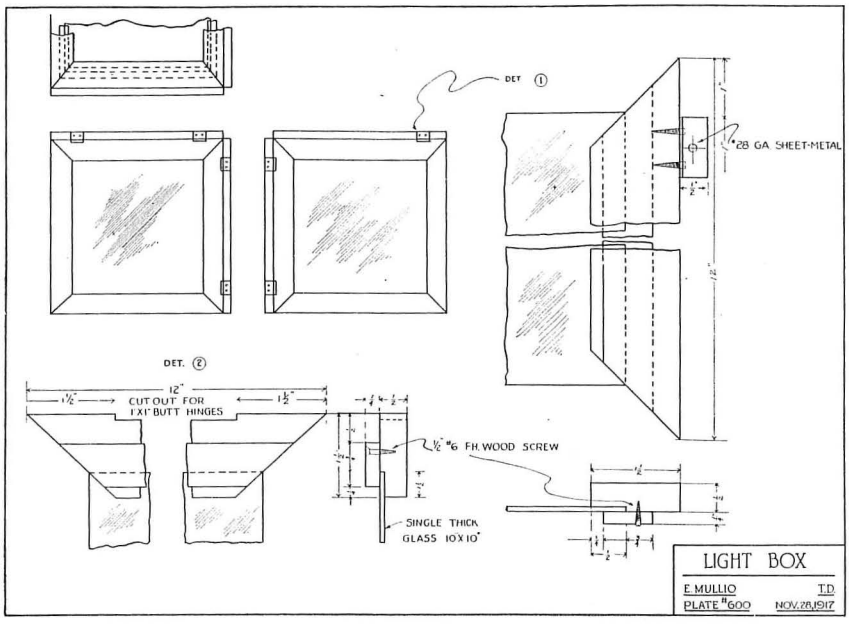


Fig. II. Drawing for Light Box. (See Page 344).

THE PENIT HAT

Bertha Graves Morey, Ottumwa, Ia.

THE hats illustrated were made in a Saturday class for girls. The problem was announced one week before presented and the girls came to class armed with ideas.

Each made a sketch design in color. A great deal of thought was used in deciding the color and much consideration regarding the clothes with which the hats were to be worn.

The painted parts of the decoration were stenciled —free hand painting being hard to manage on the rough surface of the hats. The wooden beads used were painted to suit individual needs. After the paint had thoroly dried, the yarn, hemp, chenille or raffia stitches were added.

On some were used glass beads and on others wooden button moulds decorated in colors and sewed on with yarn. Some of the various sizes and shapes of button moulds made the most interesting trimming and most effective flat decoration.

Oil cloth flowers trimmed some. Petals of oil cloth were cut and strung together with glass beads, using rather large flat corks for centers.

Oil cloth quills were made by cutting a quill-shaped piece and stitching a small tuck down the center to form the rib. On others thin slices of cork were strung or made into flower designs.

Some hats were decorated by taking long stitches, stringing one bead on each stitch, these stitches "seeming" to be taken at random and covering the crown and brim.

The most effective flowers were those of oil cloth. The back of the oil cloth was colored or painted in oil with some dark, rich color.

The petal was creased on the dotted line and strung together with brilliant glass beads. Some of the centers were flat corks, some button moulds colored the same as the backs of the flowers. When using button moulds, yarn was sewed thru the hole and over the edge.

Very effective quills were made of dark oil cloth, painted on the back to cover the unpleasant appearance. If a color was used the stitching for the rib was in the same color.

The hat with the row of round flowers is decorated with wooden button moulds, of various sizes, painted with enamel. The stems are dyed raffia, the squares are square black beads.

The disc design is made of thin slices of cork, buttonholed with yarn, using wide spaces between the stitches. The discs were colored with dye and some were left natural.

The hat with the triangles was decorated with yarn and oil cloth triangles which were sewed in place with long stitches over the triangles, a double stitch was made to the lower edge of the crown, then a bead was strung and left to dangle.

Bright button moulds sewed with raffia thru the center, then out some distance from the edge of the mould, makes a quick trimming.

PENIT HATS DECORATED IN THE AUTHOR'S CLASSES.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

THE SMITH-HUGHES LAW AND THE FEDERAL BOARD.

FREQUENT expressions are heard now among school people concerning certain alleged imperfections and dangers of the Smith-Hughes law. So great has this fear become that important educational bodies are passing resolutions calling upon Congress to modify the law in such manner as to give assurance against radical and unwise action. Considerable complaint has developed concerning the placing of the execution of the law in the hands of a newly constituted board wholly disconnected from the Bureau of Education, which is supposed to have in its hands the administration of our national system of education.

The facts probably are that the fears are not well grounded and that they owe their existence to certain attitudes and expressions of the federal board on the question of federal control. The potential dangers in the law will not become at all operative unless the federal authorities become too dictatorial and intolerant of any state or local rights and considerations. Perhaps it would be better for the federal board to assume an attitude of helpfulness and co-operation rather than the one of autocratic control and domination that it is sometimes accused of having taken. For, after all, the value of federal aid to the local community is to a large extent psychological. The financial assistance involved is neither large enough nor important enough to induce communities to give up certain local and state prerogatives and take our drastic federal dictation, either real or fancied.

The real value of federal aid lies in giving incentive and encouragement and in setting up certain ideals to be accomplished by genuinely co-operative work.

The law in its general features is good as it stands, but it, like any good law, could be made to defeat its own purposes by unwise administration.

VOCATIONAL TRAINING AND ART EDUCATION.

THE American Federation of Arts, in convention at Detroit, adopted the following resolution:

Whereas: The American Federation of Arts at its Ninth Annual Convention, held in Detroit, May 23 and 24, 1918, devoted the greater part of its discussion to the problems of Industrial Art; and,

Whereas: It was shown that good design and the highest type of workmanship in American manufactures are absolutely necessary to enable the United States to hold foremost place in the world's commerce; be it therefore

Resolved: That the American Federation of Arts urge the Federal Board for Vocational Education, which controls the funds appropriated thru the Smith-Hughes law, to adopt the principle that industrial art be given a prominent place in all vocational education supported by this law.

The Smith-Hughes law provides federal aid for instruction in the wage-earning employments only. This implies that: Excepting as design is used in the exercise of a particular vocation it may not receive federal aid under the Smith-Hughes law.

Dr. C. A. Prosser, chairman of the Federal Board, is reported in an address before the Western Drawing and Manual Training Association at Grand Rapids, Michigan, as follows:

"There are forty million people in this country who are engaged in what we call wage-earning occupations of one kind or another. Ten million of these people are engaged in trade and transportation, engineers and firemen, conductors, brakemen, railroad clerks, stenographers, typewriters, and so I might run on endlessly. Not one of these people has, so far as the demands of his daily work is concerned, anything in his business that calls for the exercise of the slightest bit of skill or taste so far as material things are concerned.

"There are thirty millions of people in this country who are engaged in what we call productive work. Fourteen millions of those are on farms, and one million are engaged in mining. Now, all these people in trade and transportation, and all these people on the farms and in the mines need training in the art that they may have better taste in the selection of goods, but not one of them needs any training in art to meet the demands of his daily occupation.

"The success of American Art in the future, so far as production is concerned, depends upon the designer, for he is the man who decides the shape and the color and the form and the finish of the product, and the thing the *American workman must do* is to do the work *he is directed to do*, and the matter of success depends upon having the *best designer in the world.*"

It would seem from these statements of the chairman of the Federal Board that there is slight hope of the resolution of the American Federation bearing fruit under the Smith-Hughes law. Even tho the "highest type of workmanship" can be acquired from vocational courses in the public schools under the Smith-Hughes law the "best designer in the world" cannot be produced without extended study and practice in a special school equipped for that purpose.

We need schools of design such as the leading industrial centers of Europe have developed. The latent talent of American youth must be developed

to produce the "best designers in the world" and this is not a common school possibility. But there is a condition that is overlooked in the above statements. Goods are universally designed to sell. They are designed for the market and not to develop taste or set standards of taste among patrons.

The great success of foreign manufacture is laid to the fact that foreign goods were designed to appeal to the taste of their patrons. Foreign designers were trained to design what would sell on the market. Foreign goods have not developed American taste by their design. The burden of developing the taste of the American people for good design lies with the schools. It is an educational problem that can only be solved by making art study important and effective in our public schools and institutions. We may not expect even the most skillful workmen and the best designers to do more than produce goods that will sell.

The public will buy what it has learned to appreciate and use. Manufacture is limited by ability to sell no less than by ability to produce and manufacture is not engaged in the development of public taste but in the satisfaction of it.

THE CALL OF THE NEW YEAR.

BY the time this reaches the reader, September will be looking expectantly in the teachers' direction and beckoning them insistently toward the schoolroom. This brings the teaching force of the industrial arts to a vivid realization of the fact that this force will of necessity be much smaller than in previous years and will be considerably changed in the matter of personnel. The older members of the profession will return to duty. Young men just out of training schools and a good many fresh from high schools will enter the list of special teachers in September. A goodly number of young women will undertake the tasks the men have laid down for other and sterner tasks.

This year will be a trying year for our work. The teaching force will necessarily be reduced both in numbers and in efficiency. There are certain tendencies toward retrenchment that will unfortunately interfere with the work. Besides these, there will be enormous and varied demands laid upon the industrial arts departments by the needs of war industries, war relief agencies, and by post-war considerations.

Wise guidance and sane counsel will be needed the coming year in a greater degree than ever before. If teachers have spent their summer months as we hope they have, they will be able to carry back into their school work a bigger and finer conception of the significance of our work. Their experience of the summer should have been such as to give them lessons from industry under the feverish prod of war necessity, or from the efficiency of teaching and training in army and navy, or from reconstruction hospitals where the re-making of men is accomplished thru the agency of wisely devised and skilfully directed work.

Teachers, therefore, should respond with vigor and enthusiasm to September's beckoning call and should take up the tasks, made heavier by the exigencies of war, and bend every energy toward their accomplishment. The older and more experienced ones should improve every opportunity and exhaust every means of guiding and helping the younger and less experienced to do the most work for the greatest number, in the best possible way, in the shortest possible time, with the least possible waste.

AN ENFORCED INCREASE.

AFTER considerable delay and with great reluctance the publishers announce an increase of the subscription price of the *Industrial-Arts Magazine* from $1.50 to $2 per year. Every item entering into the production of the Magazine has increased enormously during the past three years. In the case of paper, and similar large items, the rise has been more than one hundred per cent, and only by the most stringent economy and wise business management has it been possible to continue and to maintain a high editorial and mechanical standard.

The amount of the increase in subscription price will not equalize the large additional burdens which we are carrying and will not offset the ruinous increases in postage which the government has imposed since July 1st. It will enable us, we hope, to weather the storm and to continue to be of service during these sore days when industrial education is so essential to the stability not only of our democratic institutions, but also a great factor in the efficiency of our armies.

PREPARING THE BOY FOR INDUSTRY.

The influence of industrial surroundings and opportunities upon the boy starting to work will depend in no small degree upon the mental, physical, and moral training he has received, and upon the schools must fall the chief burden of his preparation.

Most young men in industry eventually specialize in their work, or become highly skilled in some one process, but extensive training and varied experience are valuable preliminaries. Without them there is apt to be much drifting from place to place as the young man seeks his ultimate job. Vocational guidance and vocational training will assist in directing young men to a considerable extent, tho not eliminating the work of adjustment which must take place after entering industry.

Such schooling as will create the right attitude toward productive work, encourage self-reliance and ingenuity, enable the boy to combine quantity and quality of output and give him a proper appreciation of the basis for promotion, will help prepare the young men for that period of adjustment which must occur in the first five or more years of employment. Definite trade training will sometimes be possible, but in a larger number of cases, it will be possible to teach the boy the "alphabet" of certain trades, enabling him later to master more readily the combination of operations which is required in his special task. Adaptability will carry him farther than manual dexterity alone, and elaborate training for a specific job may fail to prepare as well as does general schooling. The emphasis may well be placed upon the teaching which prepares for future growth, rather than upon that which tends toward immediate money return.—*Louis L. Park, Superintendent of Welfare, American Locomotive Company.*

BELTING AND BELTS

Wm. J. Sansom, Milwaukee, Wis.

Hill's Reference Library says: Belt, belting, a flexible endless band, or its material, used to transmit motion or power from one wheel, roller or pulley to another and common in various kinds of machinery.

A number of different materials may be used in the manufacture of belting, either single or in combination, such as leather, cotton duck, woven hemp, flax or manila, rubber and other waterproofing material. Flexible steel bands are used for certain kinds of work also, but to a very limited extent.

Of all the material in use for belting, there is undoubtedly a preponderance of leather due possibly to the ease with which it may be handled in making joints and its adaptability to a very general line of work and to its strength in tension and its durability.

In selecting the hides that are to be converted into belt leather the manufacturer endeavors to select those that are most nearly perfect, rejecting the whole or parts of hides having imperfections caused by barbed wire, the branding iron and grubs; also whenever possible securing the short-haired hide, as usually the shorter the hair the thicker the hide, this being due to climatic conditions of the territory in which the cattle are raised.

The hides after the initial preparation, which consists of the removal of any flesh and fat and the soaking in a lime solution to render more easily the removal of the hair, are put thru a tanning process.

Tanning preserves the hides from decay and produces a pliability to the finished product. Several preparations are used as a tannin for hides. A combination of alum and salt may be used and will produce a good leather altho it is understood that some toughness is sacrificed and the product is susceptible to damage by water.

Chrome tanned belting in which a tannin containing salts of chromium is used, is being used to a considerable extent and will render good service and is almost impervious to moisture.

Considerable of the heavier belting leather is tanned by the use of tannic acid derived from the bark of oak or hemlock trees, altho the bark of other trees not common to North America is also used to a great extent.

After the hide is tanned it is curried or stuffed with a grease; some manufacturers use cod oil and tallow, to render it more pliable and give the leather a fullness.

Not all of the original hide is used for belting leather, however, and in some cases as much as 50 to 60 per cent is rejected as not being suitable. Some large buyers of belting will purchase only center stock, that is that portion which is taken from the center of the back of the animal as it is beyond question the best. The balance of the hide not used for belting is, of course, turned into other commercial uses. The belting is of necessity made up into short lengths as each piece cannot be longer than the hide from which it is taken; these short lengths are then carefully scarfed and cemented together, forming a belt of any required length.

In years past it was necessary to make these joints by using copper rivets or by stitching, but a cement has now been perfected, that, if applied properly, will make a joint that is waterproof and has a life equal to that of the belt itself.

Rubber belting, so called, is built up of layers of cotton duck and covered with vulcanized rubber to protect the seams and edges and may be of any desired thickness. The thickness of a belt generally known as one, two, three-ply, etc., is determined in the case of rubber belts by the number of layers of cotton duck it contains. This kind of belting has an advantage over leather belting in that it is made of uniform thickness and width and can withstand the extremes of heat and cold, and is also waterproof.

Woven belts are usually made from flax, hemp, or manila and then permeated with an asphaltum preparation to give them a resistance to moisture. This belting would possibly render its best service where the temperature is above 110° F., as it is generally conceded that leather belting cannot give service in extremely high temperature. Such belting is inclined to be rather stiff and will not give an ideal contact with the pulley until it has been in operation for some time and has conformed to the faces of the pulleys on which it comes in contact.

Steel belts, made of tempered steel with the ends brazed together and the joint further re-einforced with thin clamps, have been used to a limited extent in the transmission of heavy power at high speed. It is claimed that a minimum of slippage occurs with these belts when properly installed.

Rope is used to a great extent in certain classes of work, but is only used where sheave pulleys are provided and a discussion of its merits need not enter into this article.

Of all the material that may be used, leather will undoubtedly predominate and will give good service unless there are certain conditions to combat, such as acid fumes, gases, steam or moisture, when it might be necessary to employ some other material.

While leather belting of first quality will show a high tensility its strength cannot be guaranteed to be uniform; two pieces of belting taken from the same hide frequently will show varying breaking strains.

Belting made of leather has an advantage over woven belts in that it may be cut into strips lengthwise, if necessary, without any danger of unraveling the fabric as would be the case with the woven belt, consequently if a belt becomes damaged on its edges in service it may be salvaged by trimming down to a smaller size, thus reducing waste. Scrap leather has also a high value as a carbonizing agent in the case hardening of steel and finds a ready market.

Belting may be either flat or round, the former being used almost exclusively, the latter finding its place principally on light work such as sewing machines and on some foot-power machinery.

In ordering belting the user must give consideration to conditions under which it is to operate and the selection of suitable material, whether leather, rubber or woven. Whenever there is a doubt as to the suitability of any belting for a given purpose it is always best to confer with the manufacturer, who will be pleased to advise you.

It is necessary to know the power that the belt is to transmit in order to determine its width and thickness. As it is not the intention to give any formulae for belt loads, speeds, etc., in this article the reader is referred to "Machinist Handbook," "American Machinist Handbook" or "Kent's Pocket Book" for the information.

Belting should never be as wide as the pulley on which it is to run and in a general way it may be said that it is better to use a wide single-ply belt than a narrow double-ply belt if the pulley is wide enough on its face to allow of a single-ply belt that will deliver sufficient power. Where the width of the pulley face exceeds the diameter it is well to use a double-ply belt. It is generally considered unwise to use a double-ply belt on a pulley that has a diameter of 15″ or less, as the contraction on the pulley side of the belt and the stretching on the outer side is naturally greater the smaller the diameter of the pulley.

The belting manufacturer will give you better service and be enabled more intelligently to fill your order, if given the following information.

Length of belt and whether ends should be left square, endless or should allowance for lap be made.

Width, state the size needed in inches.

Ply, give the thickness required, that is one, two, three-ply, etc.

Joints, whether to be cemented, riveted or stitched.

Grade, most manufacturers give each grade of belting a trade name and a careful perusal of their catalog will generally determine the grade suitable for your needs.

Conditions of operation, will the belt be in contact with liquids, gases, acid fumes, heat or subject to sudden loads; also, whenever possible, give the surface speed of the driven pulley.

Purchasing must not be done in a haphazard way and only sufficient quantity should be ordered at one time to meet the demands as anticipated for a few months. Upon receipt of the belting it should be stored in a dry place.

Specificatious may be made up to suit your needs, stating requirements for tensility and pliability determined from actual tests. It is the custom with some buyers to state the method of tanning rather than the tensility required but to the writer it appears immaterial how the leather is tanned as long as strength is obtained and a lasting product made.

It should be remembered that the practice of selling belting by length and not by weight opens many opportunities to the unscrupulous manufacturer to sell an inferior article in competition with better goods as it requires a leather expert to detect the inferior goods by their appearance, therefore the initial cost must not be your prime consideration in buying belting, as you will receive value only in direct proportion to what you pay.

Thru the courtesy of Graton & Knight Mfg. Co., leather tanners and belt makers, of Worcester, Mass., to whom the writer is indebted for some of the information presented in this article, the following price list is given:

Width	*Single*	*Double*
1″	$0.12	$0.24
1½″	.18	.36
2″	.24	.48
2½″	.30	.60
3″	.36	.72
3½″	.42	.84
4″	.48	.96
4½″	.54	1.08
5″	.60	1.20
5½″	.66	1.32
6″	.72	1.44

These prices are for a high grade of leather in which only choice center stock is used. It will be noted that the price of double ply is twice the price of single ply and so on. It should also be remembered that leather prices are soaring on account of abnormal conditions and the above prices are by no means authoritative at this time.

While the length of belts may be determined by calculation it is a better plan, when the pulleys are in place on the shafts, to actually measure the length, using a steel tape and drawing it taut around the pulleys. If the belt is to be crossed then the tape measure will be crossed in the same way.

Belting will stretch when new but the stretch may be anticipated by cutting the belt one inch shorter for every ten feet of length and then stretching the belt over the pulleys, using stretching clamps.

Avoid having belts too tight as undue friction is produced on the bearings of the shafts and it is not unusual to see a bearing that has been worn elliptical thru this cause.

Should the belt become slack and fail to pull its loads, do not twist the belt in order to tighten it, as this action is injurious even to the best leather made, but remove the belt and cut out sufficient material on one end so that the proper tension will be restored when the belt is again spliced.

Belt splicing material may be divided into four kinds, cement, leather, wire and metal stampings.

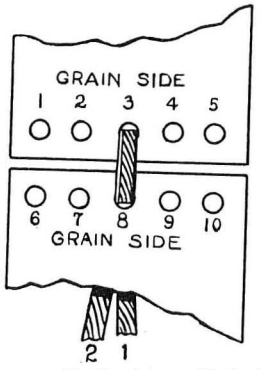
Cement is used very rarely in the ordinary machine or wood shop and usually only on large belts. The operation of cementing is not so very difficult but requires great care in the execution.

The belt that is to be cemented should be stretched over the pulleys and the points of the laps on the outside of the belt should point in the opposite direction to that in which the pulleys rotate. Keep the belt in the center of the clamps and see that it is pulled up straight. Have a board fixed to your stretcher rods long enough to support the entire length of the lap. Fit your lap together by shaving with a sharp knife and see that the leather is clean. Use a high grade of belt cement, have it very hot but not too thick and apply only to a portion of the lap at a time, only just as much as can be conveniently handled before the cement chills, and rub and hammer the joint thoroly, taking care that no air pockets are left in the lap or eventually they will result in the belt again becoming separated. The cement should be given time, at least an hour in a dry atmosphere, to harden thoroly before running the belt.

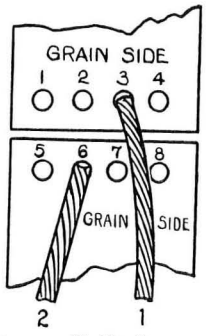
In joining the belt with leather, rawhide strips are laced thru a series of holes punched in the ends of the belting. A very good method known as the "straight stitch" is described in detail.

Cut the ends of the belt to be joined, perfectly true with a try square. Punch one row of holes in each end of the belt. The holes in both ends should be exactly opposite.

No holes should be less than ½″ from the edge of the belt, nor nearer the end than ½″. The holes should be spaced about ¾″ from center to center.



Ill. No. 1.



Ill. No. 2.

Method of Lacing Belts.

Put ends of belt together. Put lace thru holes No. 3 and No. 8 from the grain side, drawing ends of lace even. See illustration No. 1.

Put 1 lace up thru hole 3, down thru 8, up thru 4, down thru 9, up thru 5, down thru 10, up thru 5, down thru 10, up thru 4, down thru 9 and up thru 3. Punch the hole with a belt awl and fasten in usual manner directly back of hole 3.

Put lace 2 up thru hole 7, down thru 2, up thru 6, down thru 1, up thru 6, down thru 1, up thru 7, down thru 2, and up thru 8. Fasten lace in usual manner directly back of hole 8.

These instructions will apply whenever there is an odd number of holes in the row; simply use the center holes. When the width of the belt requires the use of an even number of holes in the ends of the belt, use the following instructions:

Draw the lace up thru the holes 3 and 6, bringing the ends even, as shown in illustration 2.

Put lace 1 down thru hole 7, thru 4, down thru 8, up thru 4, down thru 8, up thru 3, down thru 7, up thru 2. Fasten in hole made with belt awl directly back of hole 2.

Put lace 2 down thru hole 2, up thru 5, down thru 1, up thru 5, down thru 1, up thru 6, down thru 2, and up thru 7. Fasten lace back of hole 7 as before.

In using wire as a medium for belt fastening it will be necessary to use a machine. One type of machine used for this purpose consists of three corrugated rolls operated by a crank; a spiral needle is inserted between the rolls and by revolving the crank it is carried thru the ends of the belt, making small perforations therein, into which the lacing, which is in the form of coiled wire, is afterwards inserted in the same way as was the needle. The coils are then flattened and forced well into the belt and the ends are coupled together by fibre or rawhide cylinders or pins.

This form of joint is very efficient. Another good method of utilizing wire for belt fastening is an inexpensive machine in which wire hooks, bent in a triangular form having one leg longer than the other, are used. These hooks are very quickly placed in the machine, the squared end of the belt inserted and by depressing a lever, the hooks are deeply imbedded in the leather, flush with both surfaces, leaving a uniform row of loops extending from the end of belt. When both ends of the belt are treated in this way they are joined by passing a fibre or rawhide pin thru the loops.

When metal stampings are used for joining, the fastener which is made U-shape and has a series of sharp points regularly spaced on its length, is driven into the belt after the ends have been squared and brought together, and is usually accomplished by placing a block of wood under the belt joint and driving in the fastener with a hammer.

Care should be taken to see that the points of the fastener do not project thru the underside of the belt. After the joint is made it may be hammered over the pulley to make the joint more nearly conform to the pulley face.

In the interests of "Safety First" all belts that must be shifted by hand must be laced with rawhide, and metal fastenings should be carefully avoided.

To keep belting pl able, to prolong its life and obtain the maximum efficiency, care must be used in selecting a good belt dressing. Many good preparat ons are sold by belt manufacturers and it should be expected that they would not sell a preparation that would be harmful to their own products; the writer, however, believes that neatsfoot oil properly applied is the best belt dressing obtainable and that the use of powdered ros n should be strictly avoided.

PRACTICAL ARTS CO-ORDINATED AT READING, PA.

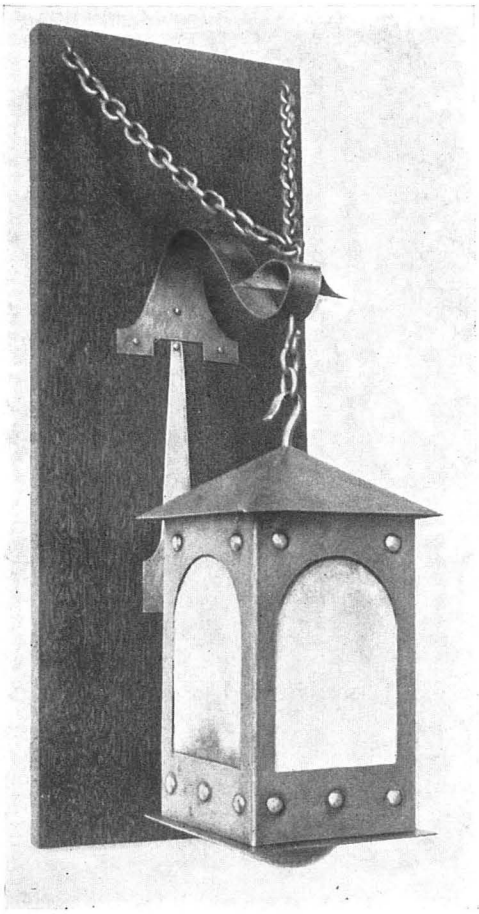
The Practical Arts Department of Reading, Pa., opened in the fall of 1917 with domestic arts work, manual training, industrial arts work and drawing combined under one head. During the past year boys and girls have had the opportunity of selecting courses adapted to their abilities and inclinations and steps have been taken to intensify and hold the interest of each pupil. Talks and lectures were given on the subject of specialized and intensive training for pupils during the war period.

In developing projects, the transformation of raw materials into finished projects was carefully studied. The study included utility, durability, economy and cost. In the grades, drawing was closely correlated with nature study, spelling, arithmetic, history and geography. Home problems were studied in designing and furnishing miniature houses. Patriotism was encouraged thru the design and lettering of war posters.

The girls in the elementary schools were active in Red Cross work. During the year they finished sweaters, wristlets, helmets, scarfs, blankets, wash cloths and patches for blankets. In the eighth grade, in addition to cookery and study of foods and nutrition, 412 pieces were made for the Red Cross in the form of knitted goods and hospital supplies.

In the high school, 454 articles were made, including knitted goods, hospital supplies and comfort kits. About 1,279 pieces were made for the pupils' own use. Girls of the cooking classes gave demonstrations at the county fair and all classwork was conducted in accordance with the suggestions of the food administration.

LANTERN OF BEATEN COPPER.
Designed and Executed by Mr. Emil F. Kronquist, Washington High School, Milwaukee.



HALL LANTERN AND BRACKET IN COPPER.
Made by Mr. Emil F. Kronquist, Milwaukee, Wis.

In the sixth, seventh and eighth grades, the boys' classes were composed of 3,100 pupils. These made a total of 15,150 projects and 1,589 special problems. Each of the grades had a choice of nine problems, while all the shops made birdhouses in response to a popular demand. A miniature house was constructed for demonstration purposes.

In the high school, freehand drawing was taken by 535 pupils, an increase of 18 per cent over last year. The work ranged from stenciling and display signs to patriotic posters. A class of 255 boys in mechanical drawing completed 3,096 drawings for cabinet making, woodturning, pattern making and machine shop departments. Drawings were made for a model home and for an administration building.

In the Cedar Street School, 142 pupils finished 234 pieces of furniture and in addition, built cabinets for supplies, shelves, lumber rack, printing tables and switch boards. A number of practical projects were completed for household use. Repairs to machines and equipment were made, tools replaced and new ones made, and repairs and equipment provided for the woodworking, electrical, printing and medical departments. In the electrical department, 35 pupils are engaged in constructing motors and generators, repairing wires and storage batteries, and transferring motors to other places for more efficient work. A department of printing has been established where all the printing for the school district is carried out. The work is correlated with English, spelling and arithmetic to give true value in practice as well as in theory.

Outside of the school, it has been possible to respond to the call of the Belgium Relief, to the Liberty Farm Camps and to Junior Red Cross work.

The technical schools and colleges of the country have been requested by the Society of Mechanical Engineers to offer instruction for women and girls in order that they may take the places of men who have, or may be, called into government service.

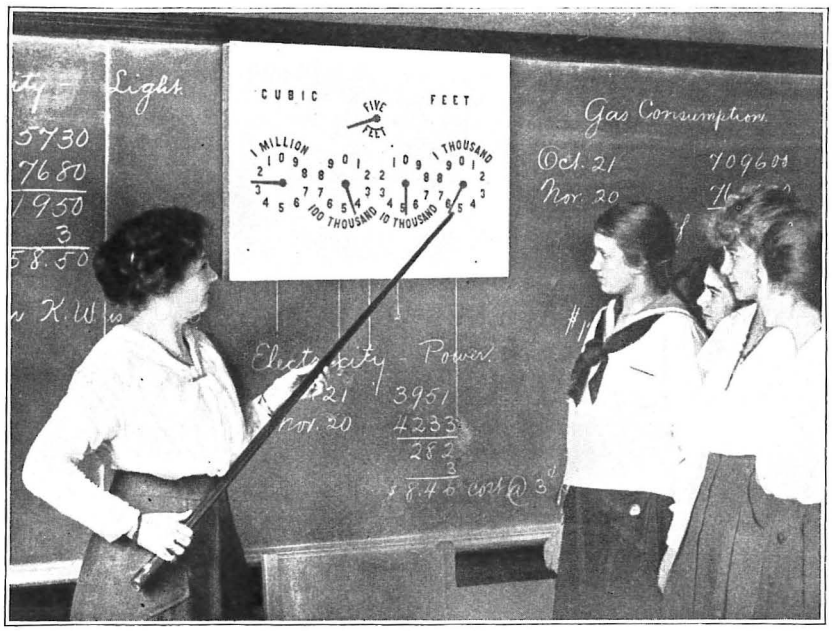
CO-OPERATION IN EDUCATION.

Dr. Henry E. Kock, Cincinnati, O.

The spirit of co-operation among municipal agencies for the benefit of the child has perhaps never been more highly developed than at the present time.

We have our welfare associations for the care of the needy, so that poverty may not be a hindrance to education, we have the department of health, thru its methods of inspection and dispensation, preventing disease and epidemics so that sickness may not bar the way of education, the colleges for teachers established to directly assist education in the preparation of teachers, and now we find our high schools coming forward to aid in solving the teachers' problems.

In futherance of the conservation idea, as well as giving the child a necessary and economic experience, the children



METER READING DEVICE IN USE.

of cities in which gas and electricity are consumed, were to be taught the reading of gas and electric meters. This ability of itself important would carry over and tend to conserve the gas and coal supply so essential at the present moment. There lay, however, a great difficulty in the way of teaching this simple experience. In most homes and especially in schoolhouses the meters are located in the cellar and usually in a dark and inaccessible corner. To take a class to the meters for instruction was in most cases out of the question, and means had to be devised to obviate the difficulty.

Supt. Condon of the Cincinnati schools had requested his teachers in the early part of November to instruct the pupils of the upper grades in the reading of meters weekly for five weeks and determine the consumption of gas and electricity, with the cost thereof, making this an excellent applied problem in arithmetic. To facilitate this a teacher of Woodward High School devised a teaching appliance that avoided the above difficulties and sprang into immediate favor. Instead of taking the classes to the meters, the meters were virtually brought before the classes. The device is really a replica of the meter dials on a large scale as the accompanying photograph illustrates. The apparatus consists primarily of a light frame supplied with numerous pulleys and hands with a means for operating them. The front consists of a large face-plate (usually 24 by 30 inches) upon which the dials are placed corresponding in position to those on the meters.

For the purpose of instruction the teacher sets the hands on the apparatus to correspond with those on the meter at the initial reading. After explaining the method of operation and the manner of reading, the hands are set to show their present position. By deducting the amount of the previous reading from that of the present the pupils determine the quantity consumed and by multiplying by the price per thousand cubic feet or kilowatt respectively, they realize how the cost is ascertained. They are then expected to apply this experience at home and thus connect school education with life experiences.

VOCATIONAL TEACHER-TRAINING SCHOOLS.

Twenty-six states have conducted summer classes during the vacation period for training teachers in vocational subjects. A majority of the classes met during June and July; the terms ranged from two weeks to ten weeks.

The cities in which schools were conducted and the men who were in charge are as follows:

Arkansas—State Normal School, Fayetteville; E. B. Mathew, instructor.

California—University Farm, Davis; S. M. Dadisman, director.

Florida—Florida State College, Tallahassee; Dean N. M. Salley, director.

Georgia—Athens; Dr. H. W. Odum, director.

Illinois—University of Illinois, Urbana; Dean K. C. Babcock, director.

Indiana—Indiana State Normal, Terre Haute; M. L. Laubach, director. Indiana University, Bloomington; Edwin A. Lee, director.

Kansas—University of Kansas, Lawrence; Dean F. J. Kelly, director. State Agricultural College, Manhattan; Dean E. L. Holton, director. State Normal School, Emporia; Dr. Norman Triplett, director. State Normal School, Hays; C. A. Shively, director.

Kentucky—State University, Lexington; J. T. C. Noe, director.

Maryland—Johns Hopkins University, Baltimore; H. F. Cotterman, director.

Massachusetts—Boston; J. G. Spofford, Francis L. Bain and Harry L. Jones, directors. Worcester; John P. Casey. Springfield; Geo. A. Burridge, director.

Michigan—State University, Ann Arbor; George E. Myers, director.

Minnesota—State University, Minneapolis; G. A. McGarvey, director.

Mississippi — Agricultural College, Agricultural College, Miss.; J. C. Roberts, director.

Missouri—State University, Columbia; C. H. Williams, director.

Nebraska—University Farm, Lincoln; E. A. Burnett, director.

New York—State College for Teachers, Albany; Marion Van Liew, director.

North Carolina—Agricultural College, West Raleigh; T. E. Browne, director.

Ohio—State University, Columbus; Dean Alfred Vivian, College of Agriculture, Columbus.

Oklahoma—Agricultural and Mechanical College, Stillwater; J. W. Cantwell, director. State University, Norman; Dr. Stratton D. Brooks.

Oregon—Agricultural College, Corvallis; E. D. Ressler, director.

Pennsylvania—State University, Pittsburgh; Geo. E. Jones, director. State College, State College, Pa.; Edwin R. Smith, director. State University, Philadelphia; William C. Ash, director.

Virginia—Polytechnic Institute, Blacksburg; Thomas D. Eason, director.

West Virginia—State University, Morgantown; Waitman Barbe, director.

Wisconsin—Stout Institute, Menomonie; L. D. Harvey, director.

Wyoming—State University, Laramie; Dr. J. E. Butterworth, director.

WHAT THE FEDERAL BOARD FOR VOCATIONAL EDUCATION IS DOING.

The Federal Board of Vocational Education, of which Dr. C. A. Prosser is director, has recently given a brief report of the work accomplished by the board up to July, 1918. The report shows that in the past few months, since the board organized, all of the states without exception, have accepted grants matching federal with state money, to be expended for promotion of vocational education in the public schools of the country. The event of 48 states taking unanimous action within a period of ten months under a permissive federal statute is unique in our history. It is conclusive proof that the law in this instance has been wisely conceived by Congress to insure widespread social benefits.

During this ten-month period, the federal board has organized its staff of experts in various lines, and of regional agents for the inspection of schools federally aided; has formulated policies of co-operation covering the entire field of vocational education in the states, for agriculture, trades and industries, and home management; has approved state plans for vocational courses, allotted federal money under these plans for the fiscal year 1917-18, and has maintained inspection of courses as they have been established in numerous communities.

As a result, vocational courses in agriculture have been introduced in 41 states, in trade and industrial subjects in 32 states, in home economics in 29 states; 22 states have courses in each of these three fields and 46 states have teacher-training courses.

An important part of the work of the federal board is the vocational training for war service. The government has commandeered the administrative machinery for such service and has freely utilized it. The training of conscripted men for army occupations is conceived to be the sort of vocational education which may properly be immediately promoted. This has resulted in the preparation of a series of war training courses adapted for classes under the direct supervision of the board, as well as classes under the war department for enlisted men, and classes conducted on a commercial basis under private civilian control. The preparation of the courses and the organization of classes was undertaken in co-operation with the signal corps, the quartermaster corps in the war department, and the United States shipping board. Up to July, the number in training had reached 26,666 and contracts in force provide for the training of 100,000 men during the current year.

Classes in shipbuilding occupations were established in California, Connecticut, Delaware, Maine, Minnesota, New York, North Carolina, Ohio, Oregon, Pennsylvania and Washington. The states of Ohio, New Jersey, Texas, Connecticut, Alabama, New York and California, have appointed agents to work whole or part time on these classes.

The investigation of methods and processes developed in the belligerent countries for vocational rehabilitation of men disabled in the war has been absorbing in its appeal to the federal board because of the wide range given to vocational education. The passage of the Smith-Sears law entrusting to the federal board the important work of re-education and returning to civil employment men disabled in the war, is a recognition of the services of the board during the period of study and the devising of a scheme of organization for the work. The several government offices concerned with the future welfare of men discharged from the army and navy will each render service to the men disabled in the war. The federal board acts in an advisory capacity in providing vocational training and continues the training to finality after discharge. In preparation for the assumption of the new work, the director of the federal board, a member, and representatives of the staff visited the Canadian institutions for retraining disabled men. Mr. T. B. Kidner, who developed the work in Canada, appeared before the joint committee in Congress and temporarily assisted the board in the organization work.

A still larger field of usefulness has been opened up to the board and for vocational education in general, since it is the general opinion that the re-educating of disabled soldiers and the administrative machinery and staff of experts may also be utilized after the work for rehabilitating victims of industry as well as the thousands of natural cripples who have been abandoned to hopeless indigence.

The federal board has undertaken to promote vocational education in the states, and to promote the development of such education in the present emergency so as to provide for the special needs of the war and of men disabled in the war. In these fields it has appeared as an administrative agency of coordination and co-operation, in which it has conceived a vision of usefulness for the future which is in a fair way to be realized.

In realizing the program of vocational education it is apparent that the state education authorities have responded splendidly to the appeal of the government thru the federal board, to demonstrate the practical utility of vocational education in the exacting emergency of war. The institutions providing the training for conscripted men have stood the test of devising schemes of training and of organizing staffs of experts for carrying out the instruction. This demonstration of social service in an emergency will stand as a credit to vocational education after the war, fulfilling the highest ideals of its advocates, and promising greater achievements for the future when peace comes.

TEACH AMERICANISM AND TRADES.

Two pressing national needs disclosed by the war, namely, more trade schools and more thoro Americanization of foreigners, are discussed in the last report of Dr. William H. Maxwell, superintendent-emeritus of the New York City schools. Dr. Maxwell refers to these as the first lessons taught by the war. He urges that there be more trade schools and that continuation schooling be made compulsory up to the age of 18 years. Immediate steps should be taken to teach American ideals, history and language to foreigners thru the facilities existing in the schools.

"This is not the time," declares Dr. Maxwell, "to enter fully upon a theoretical discussion of the advantages of teaching trades. The stern hand of history has shown us that an untrained people is a people undeveloped economically, physically, and morally. There is no room in our country today for those who are not fitted for some definite calling. Our nation needs the intelligent, well-trained effort of every man and every woman within its borders. While some may render this service in the professions or in trained scientific, commercial, and other industrial pursuits, the great mass of the people must render it in the various trades. Altho we realize that it is a blot upon the honor of a country to have a large percentage of illiterates among the inhabitants, and consequently appreciate the importance of compulsory education and child-labor laws, we have not realized, as yet, that it is just as much a matter of reproach to have a large number of persons who can read and write, but who are not fitted for any particular kind of work. Is it not a significant fact that the so-called Industrial Workers of the World consist almost entirely of persons who have no trade? Could such an organization be formed among skilled trade workers?

"Education for a trade cannot be properly obtained in our prevocational schools, as I have shown, or in any schools that give short courses of a few months each in a number of vocational lines 'to ascertain the pupils' aptitudes.' It can be obtained only by thoro, concentrated effort in one definite line for a considerable period of time.

"We should extend and develop our system of trade schools by having many such schools, with full equipment and competent teachers in different parts of the city, so that education for trades may be within the reach of all who deserve it. Of course, these schools should be in intimate relationship with the industrial world about them and thru co-operative classes and skilled teachers, should change and modify their work in harmony with trade needs and practices.

"In addition to the establishment of the necessary trade schools, the compulsory education law should be amended so as to make attendance on continuation schools for six or eight hours a week taken from the employer's time, compulsory up to the age of eighteen on those pupils who leave school before that age."

A vocational training school and hospital has been established on the Garrett estate at Baltimore, Md., for the re-education of blinded soldiers, sailors and marines. Mr. O. H. Burritt, of the Pennsylvania Institute for the Blind, has been appointed educational director of the school, and Miss Jenny A. Turner, as reconstruction aide.

Philadelphia has been selected as the location for one of the sixty new reconstruction hospitals to be established by the surgeon general in a number of cities. A survey has been begun of the industries of the city with a view of ascertaining how many soldiers can be employed at gainful occupations.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

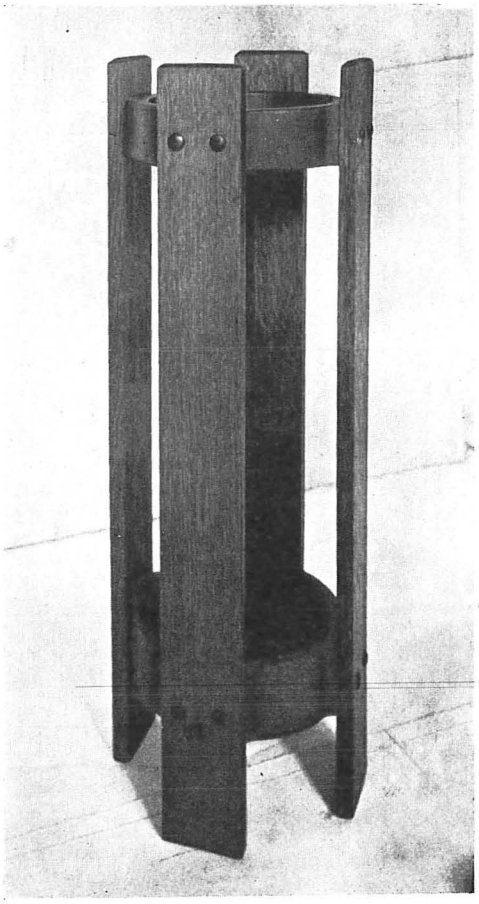
UMBRELLA STAND.

L. Day Perry, Supervisor of Manual Training,
Joliet, Ill.

It is a rare case when one may find in either the commercial stores or the manual training shops an umbrella stand or rack of good line and form. The designer is so limited by the requirements that really effective pieces are hard to evolve. It is not claimed that the stand illustrated here fills all the requirements of good design and service, but it approaches these to a greater degree than many claimed to be well designed.

The base is built up of four segments as is indicated in the plan for sawing forms. These are cut from a pattern developed from a full-size drawing. Dowels are used to strengthen the four joints and the four pieces are glued up with the base in one operation. The four segments for the top form are built up and glued in the same manner. The posts or uprights are fastened to the forms with screws in the manner shown. The screws aid materially in strenghtening the joints. The countersunk screw holes are capped with wood buttons, which may be procured on the market. These add a pleasing note to the structure and constitute a simple method of assembling. However, those who object to such added decoration may utilize dowels thruout.

A drip pan of hammered copper laid in the base, with the structure fumed and oiled, completes a problem of unusually effective lines.

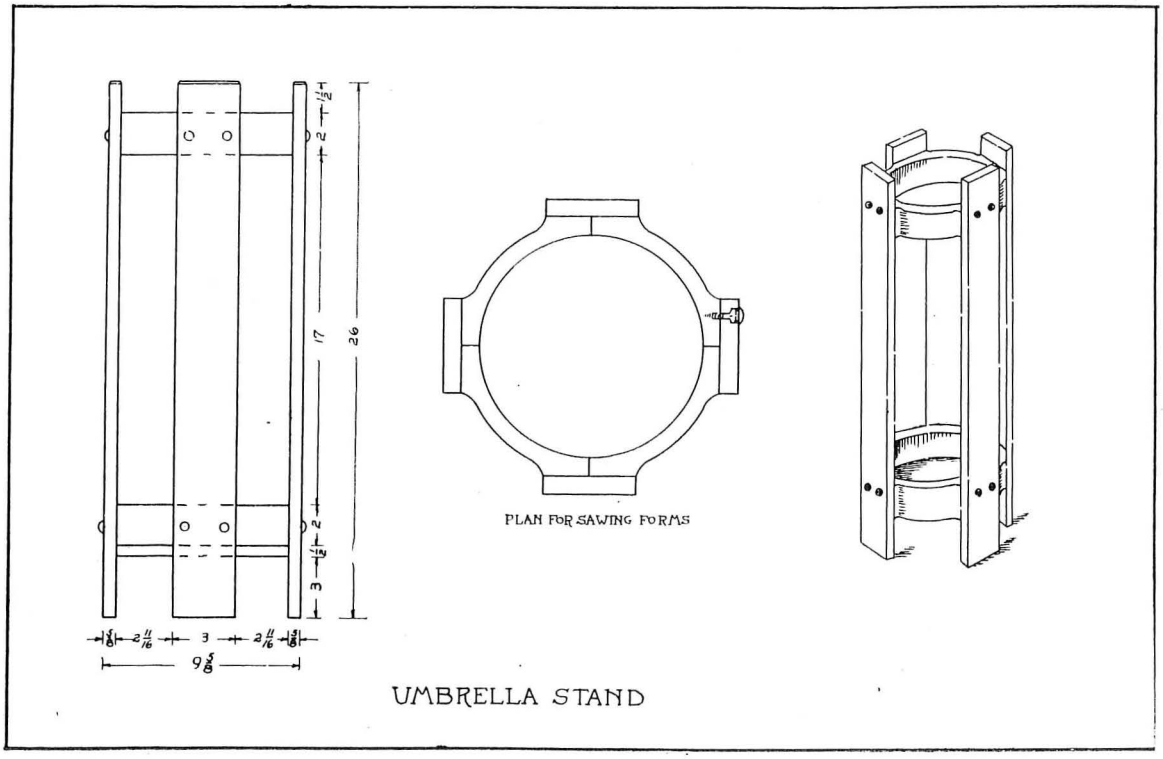


The Umbrella Stand.

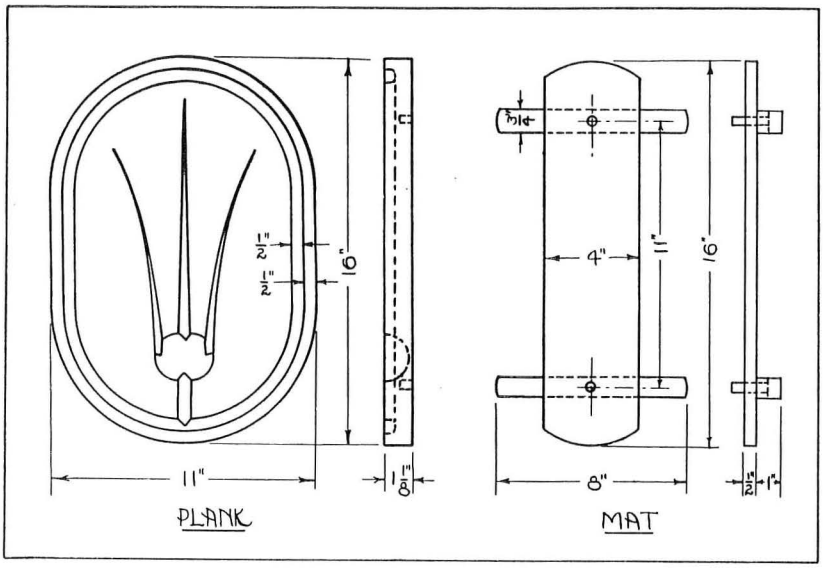
A STEAK PLANK AND MAT.

Ralph F. Windoes, Davenport, Ia.

In the orthodox courses in woodworking, the pen tray in one of its many designs has always been made the principal exercise for the use of the gouge. As is the case with the coat hanger, teachers are tired of this project and are usually willing to consider a good substitute for it. The steak plank illustrated is offered as a suggestion for this substitute. Of course it uses more material, but in schools where the students buy their own, this objection is not sustained.



DETAILS OF UMBRELLA STAND.



Details of Steak Plank and Mat.

The half-tone illustrates its finished appearance, while the working drawing makes its construction clear. White oak was used for the one illustrated, but elm, maple, birch, or most any other hardwood can be utilized. Of course a one-piece board is essential, as a glue joint would surely open when subjected to the heat of an oven, with the moisture of the steak on one side and the dry heat on the other.

No finish is used on the plank, while the mat can be stained and given a wax finish.

The plank is held to the mat with two metal dowels. These can be 20d nails sawed about 1½" long with the exposed ends filed smooth.

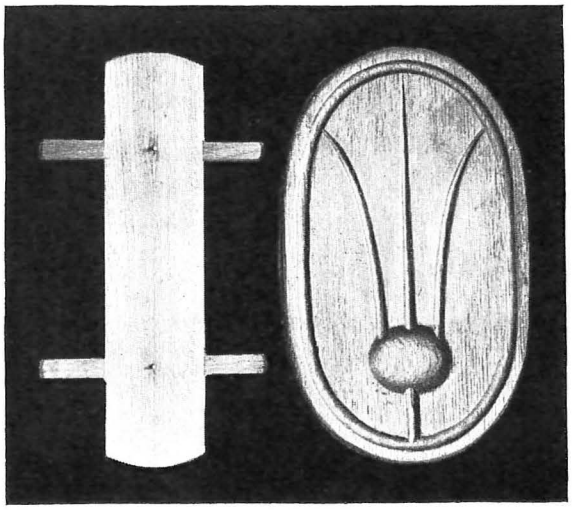
GO-CYCLE.

L. C. Peterson, Director of Manual Arts,
State Normal University, Carbondale, Ill.

The go-cycle has proved itself a success from the very start. It is a great favorite with the boys on account of the high speed attainable, the ease with which it is handled and guided, and the simplicity of its construction. It is suited to boys, and girls too, from five to twelve years old, but even boys much older have found it to be "lots of fun" to take a spin along the street.

The three-wheel go-cycle has been found more adaptable than the two-wheel type for all around use. Hence that is the model that our boys generally select and is the one described in this article.

In designing this vehicle the first consideration should be given to the height of the platform and length of the body. When operating this cycle, the rider stands with one foot on the platform and with the other gains purchase by contact with the ground. The lower the platform the more nearly the line of the propelling force will be parallel with the line of motion. Thus the energy expended will nearly all be used in pushing the cycle ahead and the bodily exertion will also be much less rigorous. There is, however, another factor that enters in determining the height of the platform, and that is, the size of the wheels. The platform is supported by the axle, which is a straight steel rod. The smaller the wheels the lower the platform, but the greater is also the obstruction of any unevenness of the ground to the rolling of the wheels. The friction on the bearings increases inversely in proportion to the diameter of the wheels. So large wheels are therefore much to be desired. A long cycle-body is also desirable, as length increases stability. Yet, if too long it becomes unwieldy in making sharp turns and necessitates that the steering rod slope backwards over much which in turn increases the stress in the hinge and makes turning more difficult. The proper slope of the steering rod is where the backward pressure on the front wheel by the impact of the ground of average roughness at average speed is exactly counterbalanced by the downward pressure of the imposed load of average weight.



A Steak Mat and Plank.

The accompanying drawings will indicate the sizes of the various parts. A few directions only are necessary to be added to enable the average boy with some training to construct this go-cycle.

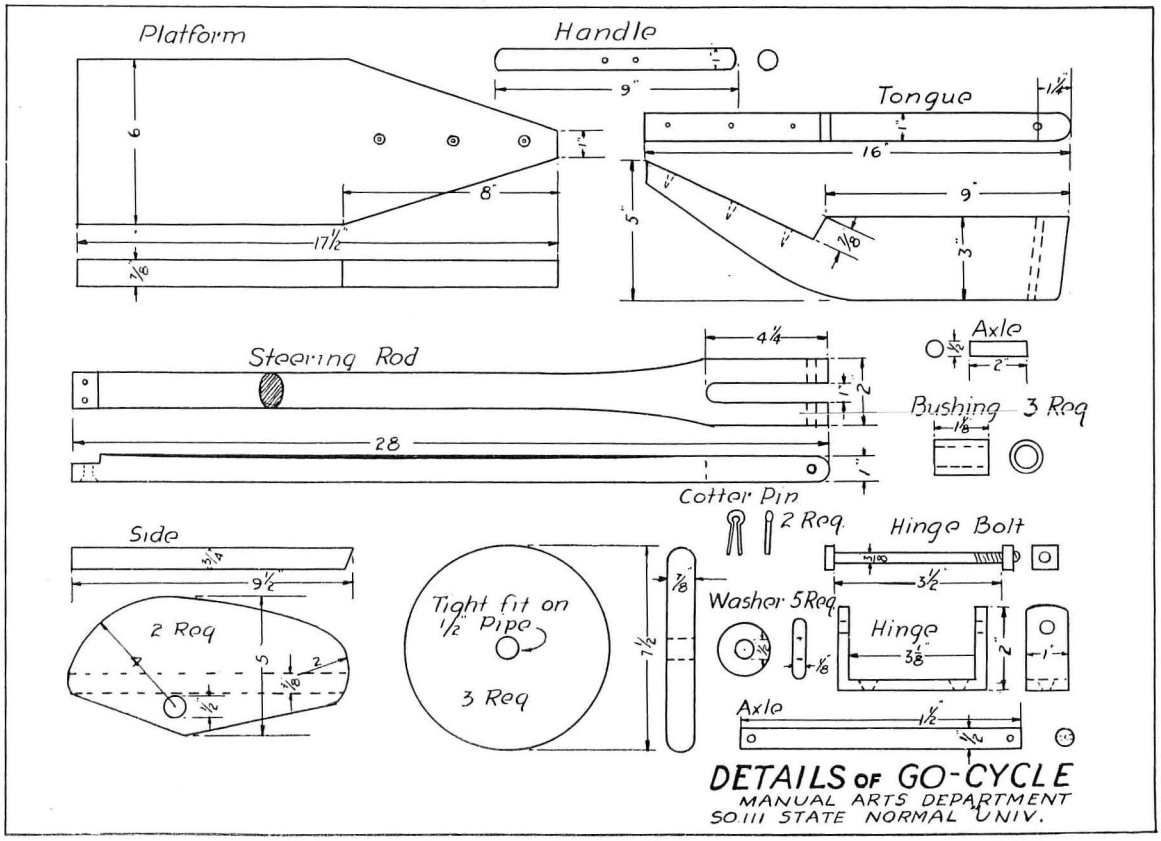
The wheels should be made of maple, cherry or some other strong wood. It may be sawed circular and the rim finished into a curved tread like a rubber-tired wheel. Bore the hole for the bearing true and to the size that can be forced on a piece of half-inch gas pipe. Then file out the hole round or smooth, or run a half-inch drill thru. If a lathe is at hand then this work may be done on the face-plate. The gas-pipe is cut off, with a hacksaw, long enough to project one-eighth of an inch on both sides of the wheel. The axle is filed down to a running fit. Holes are drilled near each end for cotter pins. The axle should also have a hole near the middle of its length for a nail to prevent it from sliding endwise.

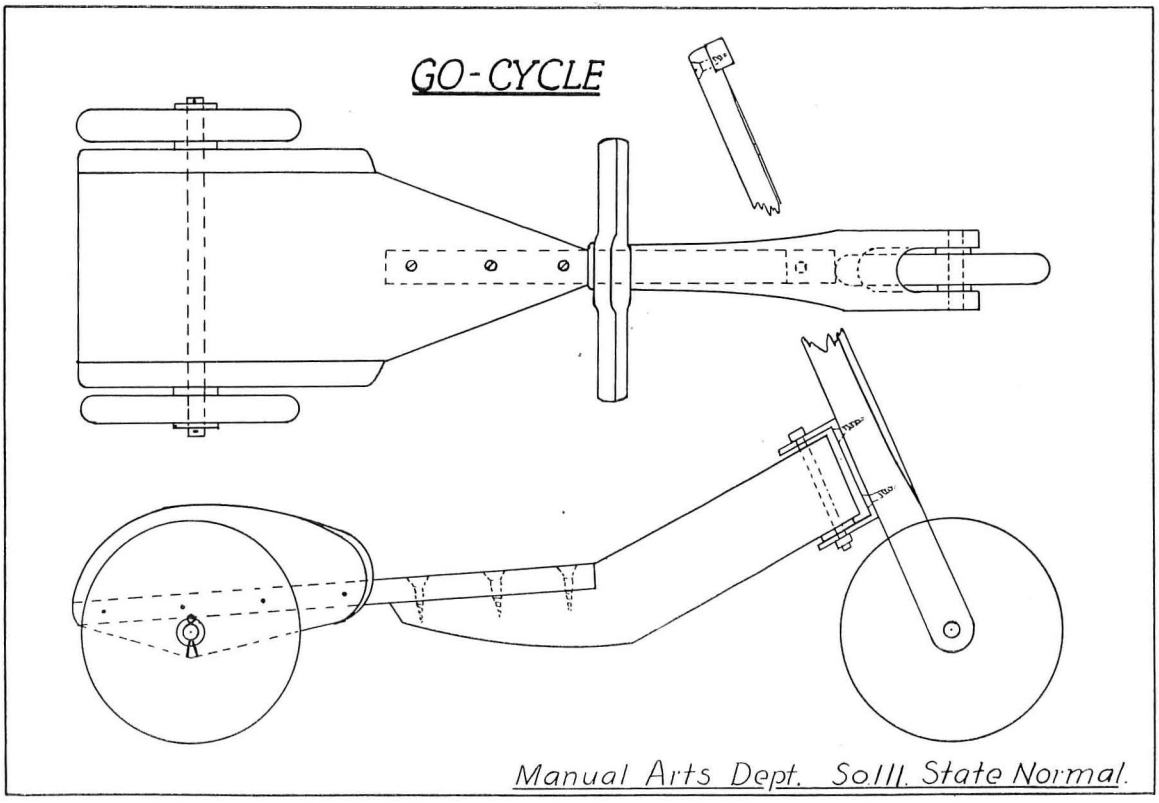
Assemble the tongue and platform. Slip the axle thru the sides. Nail the sides to the platform. Drive a nail thru the hole in the axle into the platform. With the axle permanently fixed, slip a close-fitting washer onto each bearing, then the wheel, another washer and insert the cotter-pin.

The front wheel rotates on an axle in a manner similar to that of the rear wheels. Its axle is inserted thru holes bored thru the prongs of the fork at the lower end of the steering rod. The axle should make a tight fit in the fork and the wheel should turn freely.

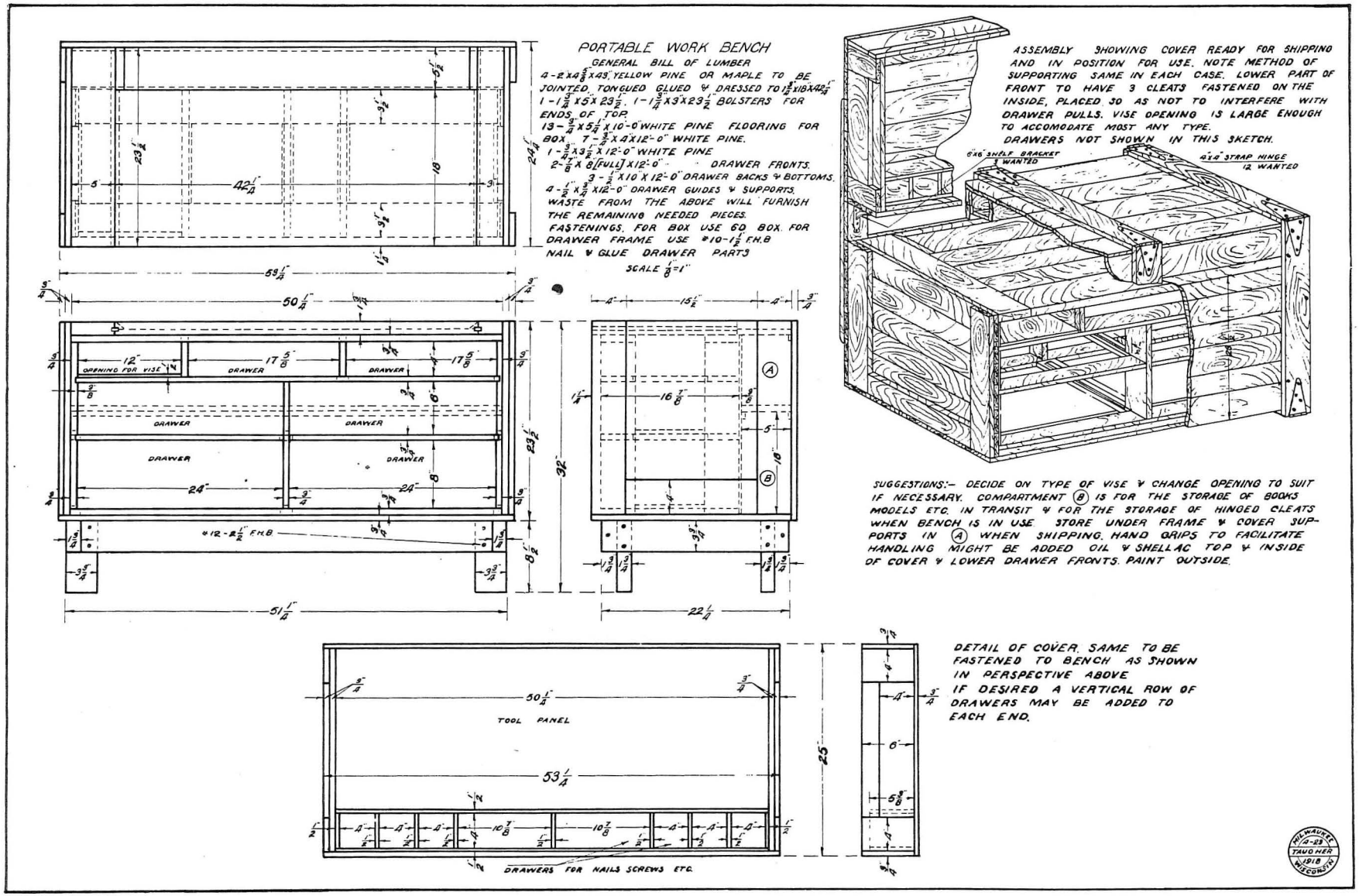
The front fork and the main frame are articulated by means of a hinge. A piece of strap-iron, one-eighth inch thick, one inch wide and seven inches long, is bent at points two inches from each end into right angles and fastened with two screws to the steering rod, about an inch above the front wheel. A bolt or spike about three-eighths of an inch in diameter and three and one-half inches long inserted thru holes bored thru the strap-iron five-eighths of an inch from each end, and thru the tongue of the main frame, completes the hinge. This method of constructing the hinge has proved its durability thru rough usage and is at the same time so simple that the boy who has access to tools can readily make it. Attach the handle to the top of the steering rod by two screws. Remove all sharp edges and corners and add a smoothing touch to the assembled whole. Finally, give the separate parts two coats of enamel of appropriate colors. In decorating these there is an opportunity for the boy-artist to apply his skill and to gratify his esthetic aspirations. Lastly, assemble the parts and oil the bearings and the go-cycle is ready for use.

Our scheme is to make these go-cycles factory-fashion and to auction them off for the benefit of the Red Cross.





DETAILS OF GO-CYCLE DESIGNED BY MR. L. C. PETERSON, DIRECTOR OF MANUAL ARTS, SOUTHERN ILLINOIS STATE NORMAL UNIVERSITY, CARBONDALE, ILL.



DETAILS OF PORTABLE WORK BENCH.
Designed and made by William P. Taugher.

PORTABLE WORK BENCH.

Private Wm. P. Taugher, Base Hospital No. 22,
American Expeditionary Force.

This is the time of the year when many manual training teachers will be facing the problem of a shipping box for their tools, books and models. As a suggestion for the solution of this problem the writer offers the drawing and cuts of a portable work bench. It can be knocked down and made ready for shipping with all parts contained within what appears to be a simple shipping or packing box.

There is no end to the various modifications and adaptations that may be worked out from this general idea. The photographs are cuts taken of the original bench worked out by the writer. It is a larger bench than the drawing calls for, as it was built to accommodate four-foot bar clamps. The cut showing the bench closed does not show the cleats around the outside, as it was not deemed practical to put them on simply for the making of the picture.

The vise should be the first thing decided upon and the bench adapted to it. Modifications of this bench would be a proper suggestion to pupils desiring to have a shop at home. The idea of permanency would prevail in such a case rather than the knock down feature.

The Portable Work Bench.

A LADIES' WRITING TABLE.

H. R. Porter, Director of Manual Training,
Miller High School, Olympia, Wash.

This piece of furniture has been made of Honduras mahogany, and crotch veneering has been employed on the front of the drawer. Particular attention has been paid to outline enrichment by means of inlay.

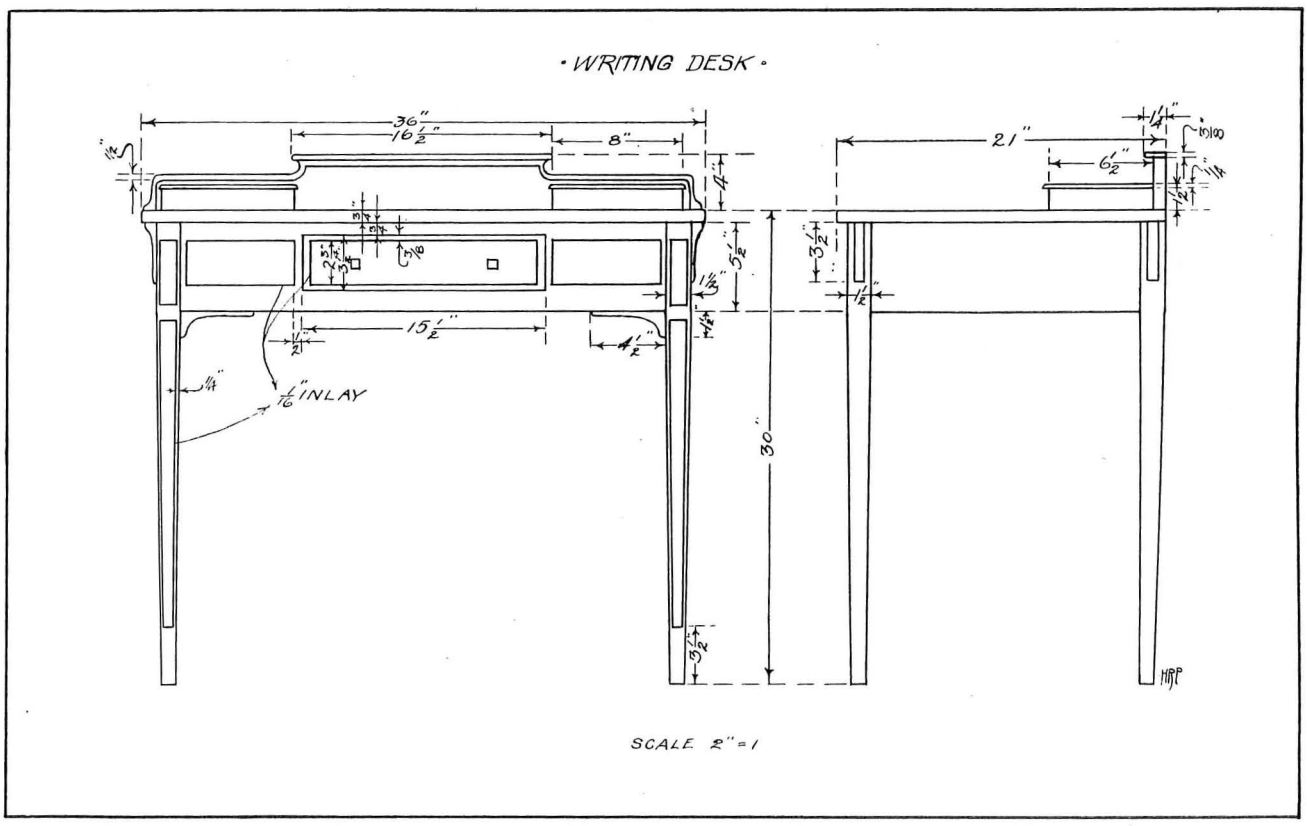
The desk has been finished by treating the wood with tannic and pyrogallic acid, followed by a strong lime solution. It was then given a coat of hot boiled oil and when thoroly dry was shellaced and finally varnished. The final coat of varnish was rubbed to a high gloss with pumice and rotten stone.

MANUAL TRAINING AT RED BLUFF, CAL.

During the school year just closed, the manual training department of Red Bluff, Cal., completed the erection of a new shop building which harmonizes with the general architecture of the gymnasium building erected the previous year. The shop measures 60 by 90 feet, provides for a benchroom 30 by 60 feet, a tool room, a supply room, a finishing and staining room, a lumber room, an automobile shop 30 by 60 feet, a forge shop, a sheet metal room, a drawing room, and a machine shop. The cost of the structure was $7,500.

The woodworking and drawing departments have been in operation for several years but this year it is planned to reorganize the forge shop and to add machine and automobile departments. Mr. J. J. Hammer, who will have charge of this department, plans to add machine lathe, gas engine, electric motor and automobile repair work to the course.

It is the purpose of the faculty to offer a full four-year course in vocational lines, with an equal amount of training in freehand and mechanical drawing. Mr. E. E. Biddall, who has had charge of the woodworking and mechanical drawing for the past three years, will act as head of the entire manual training department.



DETAILS OF WRITING DESK.

THE PITTSBURGH N. E. A. CONVENTION

Extracts from Important Addresses

That the war has disturbed American education in all its phases and that vast readjustments are pending in which vocational education will receive a strong impetus are facts that the Pittsburgh convention very clearly brought out. And, altho formal discussion of the problem of vocational education was almost wholly excluded from the general program, practically every speaker referred to it and allusions to the changes which must come from the operation of the Smith-Hughes law were frequent. Numerically the convention was exceedingly small, but those in attendance made up for the absence of their professional colleagues by very faithful attendance at meetings and conferences. The sessions of the Department of Vocational Education and Practical Arts were among the largest of the sectional gatherings and there was considerable enthusiasm. The members of the Federal Board for Vocational Education appeared at the meetings of the department and gave evidence in their addresses that they are men of affairs and of practical educational ideals. In the absence of President Frank H. Shepherd, who is in the federal service, Miss Adelaide Steele Baylor presided.

The interest in the department meetings centered about three topics:

1. The re-education of returning and disabled soldiers.
2. Federal and state vocational education in relation to each other and to the general problems of vocational and practical arts education, particularly with reference to readjustments to meet new demands precipitated by the present crisis.
3. The influence of war conditions on the vocational education of girls and women not only with reference to wage earning pursuits, but also homemaking.

The whole of the first session on Wednesday, July 3, was devoted to re-education during and after the war. Mr. Charles H. Winslow described the American plan which is to be developed under Dr. C. A. Prosser; Mr. Frank Duffy discussed the same subject from the standpoint of the trades unions and employers; and Mr. Thomas B. Kidner of Canada related the experiences of the Dominion Government.

On Wednesday afternoon Mr. John Callahan explained the Wisconsin dual system of control; Mr. Howard G. Burdge discussed the New York plan and Miss Baylor read a paper on the education of the homemaker. Hon. James P. Munroe, member of the Federal Board for Vocational Education, closed the session with a discussion of the readjustment in education to come after the war.

The department celebrated the Fourth by listening to Mrs. Mary Schenck Woolman on the influence which war conditions are exerting on the vocational education of girls, and to Mr. Louis L. Park on the preparation of boys for industry.

In the absence of Dr. P. P. Claxton, Supt. W. M. Davidson spoke extemporaneously on the subject of education to meet the new economic demands and his words proved to be so fitting and inspiring as to call forth an enthusiastic vote of thanks.

The absence of several speakers on Friday afternoon caused the session to become a round table at which Mr. James P. Munroe interpreted the Smith-Hughes law and answered a volley of questions on the policies of the federal board. Extracts from the more important papers read at the meetings are printed below.

The department elected the following officers:

President, Arthur F. Payne, Associated Superintendent of Schools, Johnstown, Pa.; first vice-president, Adelaide Steele Baylor, Indianapolis, Ind.; second vice-president, Robert J. Leonard, University of California, Berkeley, Cal.; secretary, Howard G. Burdge, Supervisor of Vocational Education, Military Training Commission, New York.

EDUCATION REGARDING PRACTICAL WORK UNDER THE PROVISION OF THE SMITH-HUGHES ACT.

No absolute standards as a measure in values have ever been evolved for vocational education. Therefore to arrive at the educational value of practical work we are compelled to state it in terms of general education. Our standard of value for vocational education should be, in terms of, the effect such education has upon the life of the pupil. This standard to be taken in a pure sense and to deal with his commercial and professional life as well as his social standards.

Practical work in agriculture teaches the youth in terms of those factors with which he will be surrounded in after life. It develops a harmonious relationship between the pupil and agricultural phenomena. Farm life therefore being understood by the pupil, and prospective farmer, is a more pleasant life by virtue of this understanding of the things considered mysterious. Practical training in agriculture also essentially affects the future life of the pupil by giving him an educational training which will enable him to perform the operations of the farm intelligently, effectively and skillfully. Such training is bound to have a decided educational value when measured in terms of the above.

Not all practical work in agriculture is necessarily educational. It is frequently nothing but a physical training dealing entirely with methods of application rather than with an understanding of the problems outlined. The operation of practical work therefore becomes educational only where definite methods in teaching practical work are carried out. Vocational education should carry the three following conditions:

First, it must deal with the fundamental principles underlying the vocation.

Second, the application of the principles, and

Thirdly, development of skill in the application of these principles.

Therefore supervised practice must come under the last two heads and should cover the following points: Practical work is educational only in so far as it is the application of some principle previously learned. The degree of educational value that practical work possesses, is measured by the knowledge the pupil possesses, of the factors which control the results of such work. Practical work is educational in so far as a student is doing a piece of work which is the result of a logical deduction of his own or the proof of such deduction is shown. Practical work is educational only when the pupil has a plan to work by, same can be mental or written. Practical work is educational only up to the point where the pupil is learning or a degree of skill is being acquired. It is fundamentally necessary that the pupil draw his work to a definite conclusion in order that he may study the results, and measure his work in terms of the results. —*R. D. Waltby, Supervisor of Agriculture, Athens, Ga.*

VOCATIONAL RE-EDUCATION OF DISABLED SOLDIERS.

Canada's Experience.

Pensions and war medals are not sufficient to pay the nation's debt to those who have become disabled by wounds or disease in the fight for freedom against tyranny on the battle fields of Europe or on the seven seas. Pensions must be supplemented by sympathetic and efficient aid to enable the shattered to help themselves—to become once more, conscious and able to participate in the true joy of living which comes only from useful and satisfying work.

The state should not only protect its wounded by giving them the means whereby to earn their livelihood by work, but it should also strive so to manage its work that the mutilated may come out of the disaster improved morally, socially and economically.

One of the most vital problems which the "free" nations, now engaged in this war against despotism, have to face is the demilitarization of their citizen armies. As soon as it is established that a man's usefulness as a fighting unit is over he should commence upon his vocational rehabilitation. The army habit of mind under which a man literally need "take no thought for the morrow" must be overcome, and an important part of the duty of all who have to do with the industrial rehabilitation of the disabled is to help and encourage them once more to think for themselves, to act on their own initiative. In short, to "demilitarize" them for their own good and that of the community.

In Canada, as soon as a man arrives from over seas and is transferred to one of the convalescent hospitals which are established from the Atlantic to the Pacific, he is seen by a vocational officer who is always a civilian, even tho, as in many instances, he may have seen active service and have been himself disabled. This officer, acting in co-operation with the medical officers, arranges that the man shall take up some form of work at once. The value of this is three-fold; first of all it has a great therapeutic value. Work as a curative agent will often do quite as much for a man as the medical care he receives. Secondly, it has a splendid moral disciplinary value, inasmuch as it counteracts the bad effects of a prolonged period of idleness. Third, in many cases, it may have a direct bearing upon and value for the man's return to civil life.

For the more seriously disabled, that is, the men who by reason of their disability incurred on service cannot return to their former occupations, the training begun in the hospitals is continued after a man is discharged and he is given an opportunity of learning some new occupation suited to his disability. Only a small percentage of the disabled from war will require vocational re-education for a new occupation. Canadian experience shows that of the wounded and disabled returned to Canada, only about ten per cent will be unable to return to their former occupations. Of course, only the more seriously disabled are returned to Canada, as many of the men who appear in the casualty lists are returned to duty after a period of treatment in the hospitals in France and England.

Canada is training her disabled men in about two hundred different occupations. This wide extent of courses has been possible thru the co-operation of manufacturers who have taken men into the industries themselves for the purpose of receiving training. Had the Invalid Soldiers' Commission been confined to training in educational institutions, it is evident that a very much narrower range of occupations would have been possible.

The training of the disabled has opened a real field of activity in vocational guidance. Every disabled man is treated as an individual case and all the factors of his education, his industrial history, his mentality, his remaining physical powers, and his own desires for the future are taken into consideration.

Already, as the result of the vocational training provided for all disabled sailors and soldiers in Canada, many men are now in better positions than they occupied prior to their war experience. Vocational training and re-education have solved the problem of the old soldier, and will in turn, it is hoped, solve the problem of the cripples of industry of this nation.—*T. B. Kidner, Vocational Secretary, Invalid Soldiers' Commission, Ottawa*

THE REHABILITATION OF DISABLED SOLDIERS AND SAILORS OR VICTIMS OF INDUSTRY.

The rehabilitation of disabled soldiers and sailors or victims of industry is by no means a philanthropic proposition; it is entirely governmental and national in its scope. Eliminating absolutely the sentimental and humanitarian aspect of the question, the facts all point irrevocably to this work as a part of the grim business of war, the first constructive step after so much destruction. It is a salvaging of precious material of which the foundations of this nation are a part—its incomparable manhood.

Vocational re-education of men disabled for military service is, therefore, a means not only of conserving trade skill, but of conserving it in a time of national emergency and of preventing in some degree the scarcity of skilled labor that is certain to develop as the war progresses. The nation which does not conserve the vocational skill of its trained workers will to that extent weaken its recuperative and competitive power and to that extent will consequently fail to achieve the immediate national rehabilitation of its industrial, commercial and agricultural power.

The industrial restoration of men has been found a very important feature of their physical restoration. The first aim of the doctors is to inspire in the mind of the man a belief in his own ability to live and be useful. Once the man himself is convinced that it is within his power to recover and become self-supporting half the battle of the doctors is won.—*Charles H. Winslow, Assistant Director for Research, Federal Board for Vocational Education.*

VOCATIONAL EDUCATION UNDER THE SMITH-HUGHES ACT.

Under the provisions of the Smith-Hughes Act as administered by the Federal Board, a part-time school is one maintained under public supervision or control, for the purpose of giving instructions to persons over fourteen years of age, who have entered upon a trade or industrial pursuit, and who are released during working hours to pursue instruction which shall fit them for more active and useful employment in the same or an allied trade or industry in which they are employed. The controlling purpose is to fit the students for better employment in a given trade or industrial pursuit in which they are already engaged, but are upon the lower levels, and with small prospect of advancement without special training.

The controlling purpose of all part-time schools draws its force from the law specifying "increased civic and vocational intelligence," and as one aim may be counted the increase of intelligence in a new vocation. Primarily, the work is to make each pupil a better mechanic and obtain entrance into a better occupation than the one in which he is employed.

The Federal Board has taken a broad point of view concerning the meaning which could legitimately be given to the phrase "civic and vocational intelligence." Under this interpretation it will be possible for the states to greatly extend the number, variety and enrollment of part-time classes.

The board stands ready to give the greatest latitude to the interpretation of this term, and will consider for approval any plan which will bring back to the school groups of workers between the ages of 14 and 18, or which will take the school to the place where such workers are employed.

Instruction must be designed to meet the needs of persons over fourteen years of age who have entered upon employment. This is the one, absolute restriction common to the courses of study of all part-time instruction.

Actual trade or industrial productive work must come first and because of the limited course of study must contain only the points of greatest importance and value to the learner. The high lights, not as to difficulty, but as to importance for immediate entry into the trade taught must form the nucleus of every course. As the pupils are unfamiliar with the simple manipulative process of the employment the related subjects must come later and occupy a place of secondary importance.

It is possible to reach large numbers of boys and girls who, having left the elementary or high school, find themselves in most cases, without correct guidance either as to how they shall get promotion, or as to how they shall make use of their time in the most advantageous manner, or how they may choose a more advantageous occupation. It is for these young persons that the law provides subjects which will "enlarge their civic or vocational intelligence."

As a rule these pupils are not naturally interested in learning from books. While many leave school for economic reasons, the majority leave school because formal school work does not appeal to them. They must be approached through actual trade processes and activities, and thru their interest in advancement.

They are ambitious. The fact that they are dissatisfied with their present employment and seeking entrance to a better affords a fine method of approach to their interest in instruction, and evidences the fact that they are good raw material.

That there is great need for part-time education is too patent for controversy. The drift had been away from the ordinary schools and into the industries long before the war opened up attractive opportunities for work. Lack of interest in ordinary school work: desire to be getting at some occupation where tangible returns may be had, and the spur of family necessity, are all crowding the industrial ranks with young people whose equipment is meagre. The field is a large one, and the need for part-time instruction is great.—*C. A. Prosser, Director Federal Board for Vocational Education, Washington.*

THE BIRTH AND CHILDHOOD OF VOCATIONAL EDUCATION WITH A FORECAST OF ITS DEVELOPMENT DURING ADOLESCENCE.

The last fifteen years have been the toddling, teething stage of growth of vocational education. It has naturally been subject to many of the diseases of childhood. At times it was not certain that the infant would live; and some have doubted whether it was worth raising. The present writer can say with good grace that it has been a noisy brat.

Since the whole-hearted entry of the national government into the support and partial direction of vocational education the entire situation has assumed a new aspect. The infant is no longer regarded as a foundling and interloper. He is growing and learning fast. We can see now that, while he will not meekly confine himself to a corner, neither is he likely to become a bully, even if in a few cases he is given for a while the food and freedom of "dual control." He is really capable of being civilized, even tho our refined schoolmaster senses will long object to the work-a-day clothing that he must perforce wear, and to the odors of machine shop and stable that necessarily cling to him.

One of the largest illusions now prevalent in vocational education is that a vocation, once entered upon by a young person, must be followed thru life. The fact is that modern life is organized very much on a series of occupational levels, and naturally, the beginner enters upon some level adapted to his immaturity and inexperience. No one seriously expects a girl of sixteen to be school principal or a housewife; yet in many states more than half of all girls at 16 have already entered upon full time wage earning in callings that are truly juvenile occupations. No one expects a youth of 18 to be a locomotive engineer, a machine shop foreman or a contractor. The man who is the typical farmer at the age of forty was probably a hired worker on a farm (his father's or another's) from 16 to 25, then a tenant or renter farmer and, in middle life, a farmer managing his own land and capital. In all our great manufacturing callings there exist sometimes scores of levels indicated by varying wage rates, and, to a large extent, advancement from one to the other is effected on the basis of increasing maturity and experience, and would be greatly simplified and expedited if, preliminary to each new level, adequate specific vocational training could be provided. Even in the so-called skilled trades—which are almost everywhere undergoing an inevitable economic

decline—the age of effective entry on apprenticeship is rising. Anciently in Europe it was in what we would now call childhood's year, and it is still as low as fourteen there. In America apprenticeship is rarely begun before sixteen, and in many cases eighteen is now preferred; yet many of those who must eventually become artisans are under necessity of contributing to their own self-support from the age of eighteen onwards.—*David Snedden, Professor of Education, Teachers' College, Columbia University.*

AGRICULTURAL EDUCATION UNDER THE SMITH-HUGHES ACT.

The encouragement of agricultural education is of necessity the first concern of every enlightened nation. The present war has demonstrated to a striking degree how true this is. The food administrator of Great Britain in an appeal to America said: "Unless America can send us at least 75,000,000 bushels of wheat over and above what has already been exported and before the new crop comes on, I cannot insure our people that we will have food enough to win the war."

And so, true to the call of service, the energies of a vast number of people are centered upon food production and conservation. Local, state and national agencies are efficiently directing and stimulating production. Public educational institutions are contributing largely to the success of the movement. The land grant colleges by training leaders and the public schools by training our young men for actual farming.

Altho drafted primarily for times of peace, the provisions of the Smith-Hughes Act are strikingly adapted to the times of war. Under the stimulating influences of this act, agricultural schools are being established in every state in the Union. Dedicated to serve the needs of the nation, the Federal Board for Vocational Education is advancing the cause of agricultural education that the American people and their allies may now be fed and that ultimately agriculture in the United States may be pursued by young men properly trained for their work. —*Charles A. Greathouse, Member of the Federal Board for Vocational Education.*

THE INFLUENCE OF WAR CONDITIONS ON VOCATIONAL EDUCATION FOR GIRLS.

Girls and women are filling the war industries, taking the place of the men who have gone to the front. Many are at work in mechanical pursuits for which they have heretofore been considered unfit, and in places where the unions have closed the doors to them.

They show ability to perform these tasks, and their spirit of cheerful, willing service has caused Conan Doyle to voice the appreciation of England in, "Hats off to the women of England." In England it is said all women from the duchess to the scullery maid are at work for the government.

It was realized in the beginning of the war in England that this vast body of unskilled or semi-skilled workers must have regular training to enable them to be of greater service, and thus to rise to the more highly skilled positions. Committees of citizens were appointed to consider the labor and housing problems involved, the physical influence of such heavy tasks and long hours, on women, the kind of training needed, and how to organize it. Adequate courses of instruction for all the war occupations into which women were going were opened, and now after almost four years of war English women are found in all the better paid branches which require skill and ability. They are also in supervising and professional positions of great responsibility. The definite enlistment of women for all forms of war service except fighting has followed.

In the United States at least a million and a half women are in war industries, making about eleven million women in wage-earning positions. The ability of our girls to succeed in these new occupations and their spirit of service has repeated the experience of England. The wage earning women in war service needs and should have systematic training. The trade schools for women are endeavoring to help to the best of their ability, but there are not enough of them. With the exception of these, no concerted effort has been made to help the women workers that compares with what the federal government is doing to train the men in radio work, in the ship yards, and in the construction of motor cars, gas engines, and aeroplanes. Committees of women in Washington and elsewhere are studying conditions affecting the work of women preparatory to organized training. Some beginnings have been made for overseas telephone girls and for farm workers. These wage-earning women must speedily be helped for their own sakes by taking them out of the deadening pursuits and helping them to rise, and for the sake of the country's industries must be trained as skilled workers who are needed to take the place of the men. The professional training of women for skilled and executive positions is receiving attention in our colleges and technical schools. Cultured and well trained women are being called into new fields, such as bacteriologists in cantonment hospitals, industrial secretaries in munitions and other war factories, ship draftsmen, and teachers of occupational therapy. It is difficult to keep up with the new lines of training open to these highly educated women, but much remains to be done for the wage-earning girl.—*Mary Schenck Woolman, Massachusetts Agricultural College, Amherst, Mass.*

THE COMMITTEE ON EDUCATION AND SPECIAL TRAINING.

One-fourth of the active force of a modern army is made up of technical specialists. These men must have had previous training or experience in mechanical lines. Altogether some 250 trades and specialized occupations are carried on by the army.

It has proved impossible to get by selective draft all the technical specialists needed without disrupting industrial conditions. Men must be specially trained to make good the discrepancy between the numbers furnished by the draft and the numbers needed by the army. Early in February, 1918, the Secretary of War created the Committee on Education and Special Training, to have charge of this training program. The committee has organized training centers in 136 institutions, mostly engineering schools. These centers offer instruction in courses two months in length in some 20 different fundamental trades. The largest demand of the army is for automobile mechanics, and 70 per cent of the training under the direction of the committee is in this line.

Men are specially inducted into the service by the Provost Marshal General to take the courses organized by the committee. They are under military discipline, uniformed and paid. At present there are 34,278 enrolled in the training centers.

The committee has also studied the question of utilizing collegiate institutions for more advanced technical and general training. The Secretary of War issued an order on May 8, 1918, providing for the establishment of military training units at colleges and universities and offering an enlistment in the regular army to students over 18 volunteering for training in these institutions.—*S. P. Capen, Specialist in Higher Education, U. S. Bureau of Education.*

DEATH OF MR. FRANK BALL.

Mr. Frank H. Ball, widely known as a leader in industrial education, died in Los Angeles, July 16, following an operation upon his back. He had been injured a year ago by a fall and the operation was the second to which he submitted in seeking to regain his health.

Mr. Ball was one of the pioneers in several types of elementary school activities out of which have grown the present systems of industrial education. He began his teaching experience in 1890 as an instructor in manual training. At various times he was engaged at Teachers' College, at Dr. Dewey's Elementary School in Chicago, and at the Throop Polytechnic Institute.

After the Spanish-American War he was sent to Porto Rico to introduce and direct the industrial work in five schools. Upon his return from the island he was elected supervisor of manual arts at Cincinnati and later he held a similar position in Pittsburgh, Pa. He resigned in 1916 to accept the presidency of the California State Normal School at Santa Barbara. He resigned from this position in December, 1917, to take up the work of organizing teacher training for vocational education. He wrote extensively and lectured on numerous occasions to teachers and school patrons.

In July, 1917, he met with an accident, falling and injuring his back. For several months he was unable to attend to his work and an operation was resorted to. The trouble reasserted itself during the early summer and the second operation resulted fatally.

Mr. Ball was 56 years old. He is survived by a daughter, Miss Catherine Ball.

Mr. George M. Brace has been appointed Supervisor of Manual Training at St. Paul, Minn., to succeed Mr. Donald V. Ferguson. Mr. Brace has been head of the manual training department of the St. Paul Central High School for some years and previously headed the manual training department at Duluth, Minn. He has been prominent in association activities.

Mr. Frank A. Raebig has been appointed instructor in manual training at Kankakee, Ill.

Mr. A. J. Valaske, of Iron Mountain, Mich., has been appointed instructor in manual training at Escanaba.

Miss Amelia Doddridge, of Greensburg, Ind., has been appointed head of the Home Economics Department of Wooster College, Wooster, O.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Cement Work Equipment.

837. Q.—We are planning on the installation of a course in cement work in connection with the manual training work. Kindly inform me the cost of the equipment for a class of six men.—*H. H. C.*

A.—An equipment for a manual training course in cement will not cost very much because most of the articles can be manufactured in the woodworking shop. For ordinary work to include the building of small articles such as building blocks, troughs for farm-yard use, flower boxes, sidewalks, etc., the following equipment will suffice:

1. *A mixing platform.* Such a platform can be built of two-inch lumber, nailed upon three 4 by 4's, rounded at the ends. The platform should measure about 7 by 12 feet. The outside 4 by 4's project at both ends of the platform and are bored for clevis irons so that the platform can be dragged about. For indoor use in a school basement, a smaller platform may also be made. The bill of material for such a platform is as follows:

12 pieces—2 by 12 inches by 7 feet, dressed on one side and two edges (tongued and grooved preferred).

2 pieces—2 by 2 inches by 12 feet, dressed on one side and two edges.

2 pieces—4 by 4 inches by 13 feet, rough.

1 piece—4 by 4 inches by 12 feet, rough.

2. *Measuring boxes,* holding one-quarter, one-half, and one cubic foot. The boys can make these in the woodworking shop, or still better, in the sheetmetal shop.

3. *Several wood trowels,* 4 by 8 inches in size, ½ inch thick. Wood handles.

4. *A tamper,* weighing between fifteen and twenty pounds. This can be made of a wooden block, with a wooden handle or with a galvanized iron pipe handle.

5. *Small open bins* for storing of screened sand and gravel, crushed stone. These bins can be made to suit one's own ideas, but need not hold more than about one-half to three-quarters of a cubic foot.

6. *A water barrel.* This can be picked up locally.

7. *Several water buckets.*

8. *A wheelbarrow,* preferably with a metal body.

9. *Several square-nosed shovels.* Three or four will be sufficient to start.

10. *A screen for separating sand and gravel.* A three-inch square mesh will be found satisfactory. The frame can be made by the boys. About 2 by 4 feet is a good size.

11. *Curing tubs.* Two or four of these are helpful in curing small projects. They can be made from old oil barrels sawed in half.

12. *Several finishing tools* will be helpful for fine work: a small trowel, an edger, a jointer and several floats.

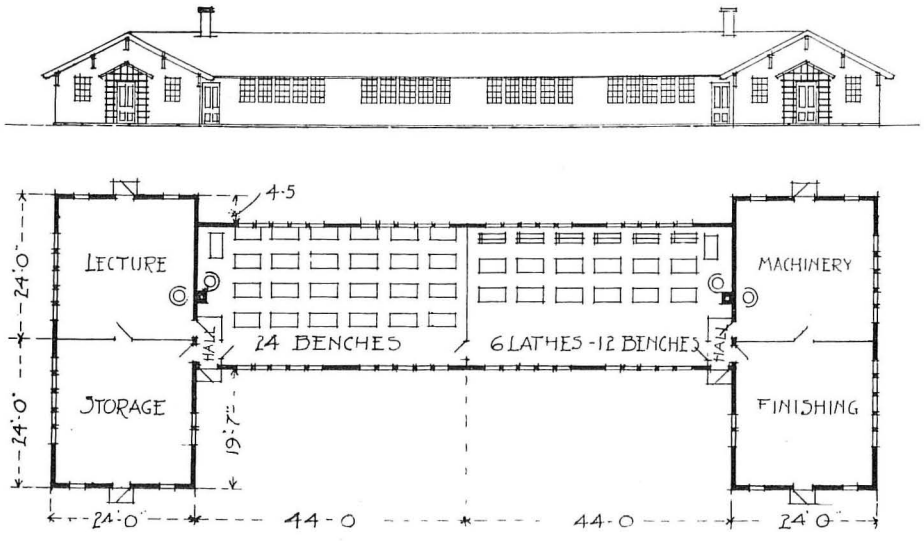
A Home-Built Workshop.

836. Q.—The school board here is considering the matter of building a manual training school, or rather building, and I would like to know where I can get plans of buildings that have proved satisfactory.

Our present needs are for a building of at least six rooms —one room for grade work, one room for high school work, one room for woodworking machinery, a lecture and demonstration room, a finishing room and a store room.—*F. W. B.*

A.—Many folk have most curious ideas as to the ownership of a set of plans. An architect is not engaged to draw plans, any more than a doctor is engaged to write a prescription; the plans and the prescription are merely the incidental means toward an end, such as the erection of the building, or the curing of the patient. And the plans, therefore, are fully and legally the personal property of the architect, even after his commission is paid; no one whatever may loan, copy or use them without his express permission. An architect is precisely like an author, whose story cannot legally be reprinted or copied, even by the magazine that has bought and published it, unless the author agrees. Yet many folk who would be horrified at the bare idea of stealing a ride on a railroad train will calmly "borrow" the product of an architect's brains, behind his back! Therefore, we cannot, and will not, loan any plans; if your board wishes a permanent building, you should by all means commission an architect for this.

But why not put up a temporary structure, that will serve your needs for some years? Your carpentry class, under your direction, can do the work; it will be far better training for them than making bookcases and bed-tables. The 24-bench room had better be 24 feet wide, outside dimension; the inside length should be 40 feet, with a four-foot alcove to hold instructor's bench and jacketed stove. The second room, to hold twelve benches and six lathes, with a little extra work space, can be the same size as the first. An average bench is four feet, four inches long, and two feet wide; two feet of passageways at either end separate it from the adjoining benches. In front, there must be from two to three feet of clear working space; two and one-half feet is probably enough, especially for grade work, tho three feet



Above, Fig. 2; Below, Fig. 1.

is better. (This assumes that the benches are single; if double, a working space of at least three and one-half feet is needed, and the bench-tops are three feet wide.) Lathes vary greatly in length; but on an average, they will require just about as much total floor space as a bench, including passageways, etc. The size of the four other rooms, wood-working machinery, lectures, finishing, and storage, depends so entirely on circumstances, that I can only make a clever guess; 24 feet square, outside, will do for a starter. I have assembled these rooms into an H-shaped plan (Fig. 1), because that gives better light and ventilation than a compact scheme; in a temporary building of this character, there is very little difference in cost between the spread-out and the solid arrangement. Fig. 2 shows the front elevation; utterly plain and simple, yet not unattractive.

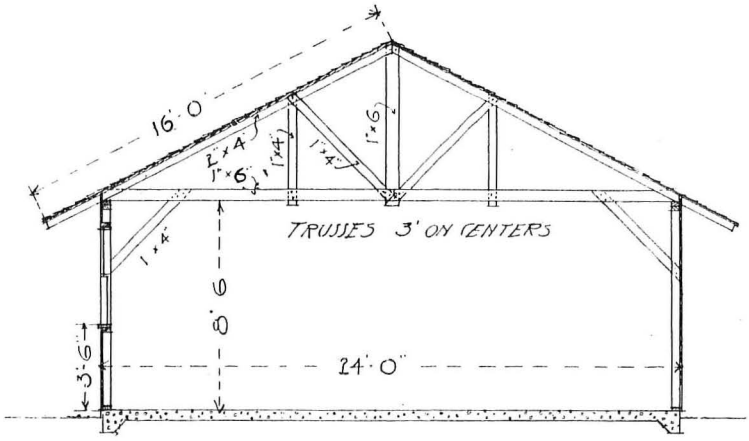
Figure 3 is a section thru the building; 2x4 sills are laid down; 2x4 studs 8 ft. long are set on these, carrying plates of doubled 2x4's. The windows are 12-light 8x10, plain rail, grouped, with double studs between. The rafters are 2x4, 16 ft. long, set three feet on centers, and trussed with light stuff, as shown. Lumber and other material can be stored on the tie-beams; out of the way, yet very handy. The roof should be sheathed, and covered with shingles or patent roofing; it has a pitch of one in two. The floor had best be concrete; very slight foundations will answer, provided they are cast in one piece with the floor-slab, and reinforced with wire lath. The walls should be weather-boarded, without sheathing; interior partitions can be one thickness of beaded stuff. No inside ceiling or finish is necessary; everything is left rough, and whitewashed. This makes it fireproof, or at least slow burning; for whitewash, if kept in good shape, is one of the best fire-resisting coatings known.

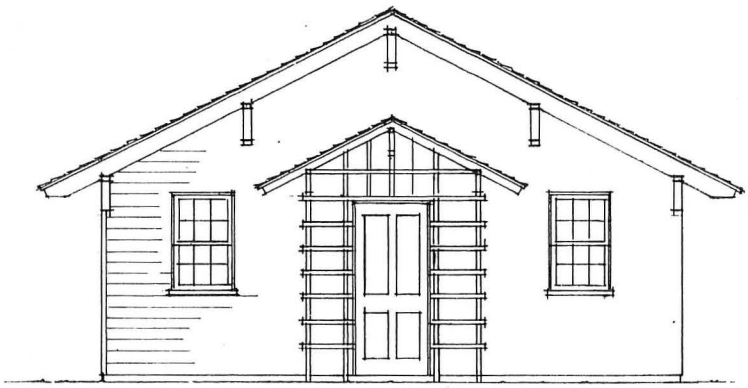
The ends of the wings may be finished off with some little care; figures 4 and 5 show the detail. The lattice work is built from 1x2 strips; the hood has rafters of 2x4, carried by simple brackets of 2x2. The barge-boards are 2x8, resting on brackets of 2x4.

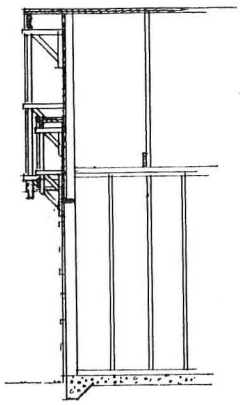
A very good color scheme is: green or gray roof, cream-white body, and olive-green trimmings, (doors, brackets, barges, lattice, etc.).

The roof has sufficient overhang to shoot the rainwater well clear, without the need of gutters; but possibly a short section of hanging gutter had better be put over each hall door, else anyone coming in or out will be drenched by the streams from the valleys.

Jacketed stoves, placed as indicated, will give sufficient heat; workrooms don't need to be nearly as warm as class-rooms.







Above, Fig. 3; Below, (left) Fig. 4; (right) Fig. 5.

Of course, a simple scheme of this sort can be enlarged or reduced, to fit your needs; let the mechanical drawing class make the plans, and the carpentry class do the work.—*William D. Brinckloe, Architect.*

Texts on Show Card Writing.

840. Q.—I am looking for a text for school use on show card writing.—*G. A. R.*

A.—*Modern Show Card Lettering and Design*, Geo. E. Watson Co., Chicago; *David's Practical Letterer*, $1, Geo. E. Watson Co., Chicago; *How to Write Tickets, Signs, and Posters*, $0.50, Geo. E. Watson Co., Chicago; *Lester's Sign Layouts*, Geo. E. Watson Co., Chicago; *Standard American Drawing and Lettering Book*, $1.75, Geo. Watson Co., Chicago; *Ticket Painting and Sign Writing*, $0.75, Funk & Wagnalls, New York, N. Y.; *How to Make Show Cards*, $1, Spatula Publishing Co., Boston; *Hurst and Nowak's Hardware Show Card Writing*, $2, Munn & Co., New York.

The Vocation of Millinery.

842. Q.—Will you please give me any information you can about millinery as a vocation?—*M. M.*

A.—The following books contain the most authoritative information on millinery as a vocation:

Millinery as a Trade for Women, Lorinda Perry, $1.50, Longmans, Green & Co., New York; *Dress Making and Millinery*, Edna Bryner, Survey Committee of the Cleveland Foundation, Cleveland, O.; *A Seasonable Industry*, Mary Van Kleeck, $1.50, Russell Sage Foundation, New York, N. Y.; *Vocations for Girls*, Mary La Salle and Katherine Wiley, Houghton Mifflin Co., Boston.

NEWS AND NOTES FROM THE FIELD.

The art classes of the High School of Commerce at Worcester, Mass., recently held an exhibition of the students' art work. The exhibit included work in nature study, lettering, home furnishing design work, costume designs, pen and ink sketching, and war work in the form of post cards and posters.

A vocational school for boys and men has been established in the high school at Steubenville, O.

A continuation school for boys and girls between the ages of 14 and 16 has been established at Decatur, Ill., under the direction of Supt. J. O. Engleman.

A second vocational school has been opened in St. Mark's Hall, New Orleans, La., under the direction of Miss Helen Gibson. Instruction is given in chair caning, basket making, carpentry, cooking, sewing and domestic economy.

The state of Illinois has received an allotment of $137,581 for the current year under the provisions of the Smith-Hughes law. Of the total, $32,852 is to be spent for agricultural education, $6,658 for home economics and industries, and $43,070 on teacher-training.

The administration at Washington has prepared a tentative plan which is to be submitted to Congress at an early date, and which provides for an extension of the draft age and for the establishment of universal military training for American youths below the draft age. It is evident that the extension of the draft age is necessary to provide the necessary millions of soldiers and to make possible a larger number of men under military control for mobilization in industries essential to the conduct of the war.

An exhibit of refugee clothing, consisting of nearly a thousand garments, was recently held by the high school and grade domestic art departments at Peoria, Ill. The garments went to the needy in France and Belgium.

Minnesota schools offering vocational and industrial training are to receive federal aid to the amount of $49,557.88, according to the Federal Board for Vocational Education. The state will duplicate the amount.

The directors and supervisors of vocational education for the states of Indiana, Minnesota, Kentucky, Iowa, Ohio, West Virginia, Illinois and Missouri, at the conclusion of their recent convention, adopted the following resolutions:

"That at this particular time and crisis in the nation there has been revealed to us our vital lack of trade and industrial workers, in consequence of which we find ourselves under trying conditions with reference to both industry and organization for war. We strongly urge the adoption of vocational training in the public schools as a means of remedying the present situation and improving conditions permanently for the future.

"That part-time training for young men and women who because of economic conditions have been obliged to sever their connection with the schools is an urgent need. We, therefore, strongly recommend persistent and wisely directed efforts in every state for the immediate organization and promotion of such part-time vocational courses and the best instruction which can be secured for this large number of young workers.

"That vocational training in agriculture and home economics, always vital to progress in our country, is now doubly so in order that food production, conservation and distribution may be kept up to a maximum of efficiency. We, therefore, urge every state to give both financial and other support to the furtherance of this important movement.

"That the war department has called upon the states for the training of the largest possible number of drafted men in evening classes before these men are inducted into the service. The purpose in this plan is to secure an adequate number of men properly trained in trades and industries, essential to army service, without withdrawing such men from civilian occupations until they are required for military service. Realizing all of the difficulties incident to the organization and promotion of such training, but also aware of the necessity which prompts the war department's call for help, we pledge ourselves to use our best endeavors in the states which we represent to secure the necessary co-operation from our communities in making this work a success. We fully realize that this is not a time to dispute orders or argue for their modification. The country's needs in prosecuting the present war to a successful conclusion, at the earliest possible date, is the matter of first importance to every loyal citizen and we pledge the hearty support of all vocational agencies in our state in the immediate promotion of this patriotic war service work."

The Brooklyn Committee for the Prevention of Tuberculosis is preparing to send out a loan exhibition of posters made recently by pupils in the art department of the Brooklyn and Queens High Schools. Each school toward the end of the school term held a competition and a number of prize posters have since

been purchased by the Committee on Tuberculosis for their traveling exhibition.

Said Mr. Graves Moore, secretary of the committee: "This competition was highly successful. The art department of the high schools co-operated in every way possible and the posters produced were so good that the committee wished them placed before a large number of people. The loan collection will be sent to a number of different cities, both east and west."

Dr. James P. Haney, Director of Art in High Schools, emphasized the practical nature of the competition. He said recently: "It is the desire of the high school art department to do work which is thoroly practical. The recent poster competition is an illustration in point. Every school in Brooklyn and Queens participated in this contest, as well as the schools in Manhattan and the Bronx. The standard of work was excellent and did much credit to the pupils and teachers who aided in the contest. It was all voluntary work and the fact that thirty of the posters were purchased for Brooklyn alone shows in what degree the pupils themselves succeeded."

The school board of Boston, Mass., has ordered that with the opening of the next year, the headmaster of the Mechanic Arts High School shall, with the approval of the superintendent, employ members of the senior class as emergency special assistants in the mechanical department in lieu of part-time work. The compensation is fixed at $1.50 per day of actual service.

The San Jose, Cal., high school will offer vocational courses in dressmaking, cooking and millinery during the fall term. The courses are free and open to every person over 14 years of age.

The boys of San Diego, Cal., during the month of July gave considerable time to the making of furniture for the convalescent hospitals on the Pacific Coast. The lumber and plans were provided by the manual-arts department of the schools and the boys merely gave their time to the work.

Pittsburgh, Boston and New York are the three cities selected for six weeks' intensive courses in employment management to be begun in the fall. These are to be preceded by a six-weeks' theoretical course at Rochester, N. Y., which will follow immediately a two-months' course in practical industrial training in Cleveland, O. The work is considered one of the most important of the new vocations which the government offers to women and is as necessary as first aid or Red Cross service.

Woodstock Training School, near Memphis, Tenn., has been designated as an institution for vocational agricultural training by the Federal Board of Vocational Education. Instruction will be given in farming, carpentry, farm mechanics, feeding pigs, poultry and cows, gardening, canning, drying of fruits and vegetables, elementary agriculture, care of milk and sewing. Mr. T. J. Johnson, the principal, is to be retained on a twelve-months' basis and his wife will be employed to teach home economics and household industries.

Fort Worth, Tex. Home economics will be offered to white and colored students as a means of preparing them for work as cooks and seamstresses. Radio courses are to be continued under government support.

The school board at Terre Haute, Ind., has purchased $6,000 worth of equipment for the machine shop at the vocational school for men and boys.

The woodworking classes of Erie, Pa., recently completed a shower bath, a latrine, mess tables, tent floors and refrigerators for the Boys' Liberty Camp at Linesville. Work has been begun upon a reading table for use at the camp. The products of the classes show good workmanship.

An eight-weeks' summer course in vocational subjects was conducted recently at the Columbus Trade School, Columbus, O. The course was open to drafted men, boys under 18 years, and industrial workers.

A moving picture show illustrating the results and advantages of vocational training for boys and girls was given recently at the chemistry building of the University of Kentucky. It was given under the auspices of the vocational and educational department of the university for the benefit of summer students.

The sum of $31,250 has been allotted to Maryland for vocational education. Of the total, $9,683 is for agriculture, $11,672 for trade, home economics and industry, and $9,894 for teacher training.

A vocational high school has been established at Teachers' College, Cedar Falls, Ia. The school has been established to meet the demand for more vocational education emphasized by the war and offers a three-year course.

A summer manufacturing class has been successfully conducted for the second season at the Duluth High School, Duluth, Minn. The class is made up of a group of high school boys, working under the direction of two shop instructors and a high school teacher.

The class has made shoot-the-chutes, teeters, kindergarten furniture, filing cabinets and bookcases, dining room furniture, work benches, chests, wardrobes and a number of tables for school use. They have also made a sander, jigs, and machine accessories. The entire work is in charge of Mr. Curtis R. Carman, instructor in high school woodworking.

The manual arts department of the North Dakota Agricultural College, Agricultural College, N. D., in developing class projects, has worked out a series of lessons in the form of mimeographed sheets and blueprint sketches. The mimeographed sheets contain definitions, descriptions of articles or processes, tables, questions to be answered by the students, and practice exercises.

The Third Annual Prize Competition in textile designs for women's wear will take place October first in the galleries of the Art Alliance of America, 10 East 47th St., New York City. Altho contestants may submit as many as ten designs, only one prize may be awarded to each person. Work accepted by the judges will be on display in the galleries from October 16th to 31st.

Designs must be submitted by October first to the Art Alliance and should be in such form that they can be reproduced with but slight technical changes.

Prizes will be awarded on the basis of orginality, artistic merit and adaptability for use in costume design or interior decoration. Prizes of $250, $150 and $100, together with ten of $25 and ten of $10 will be awarded for printed silks. For woven silks the prizes will be $100 and $50, for silks intended for interior decoration $100 and $50, for cretonnes $100 and $50, for printed cottons $100 and $50, for ribbons $100 and $50, and for special awards a fund of $300 has been provided. Art students or teachers who are interested in the art competition should address the Art Alliance of America at New York City.

The boys of the cabinet shop of the Oakland Technical High School, Oakland, Cal., recently completed orders for camp, dressing and folding tables for the Red Cross and several articles for the cantonments. The shop department, during the summer, also conducted a school for army mechanics. The work is under the direction of Mr. J. A. Robison, head of the shopwork in the Technical High School.

A junior industrial high school for pupils in the seventh, eighth and ninth grades has been established at Des Moines, Ia. The school has been established following an extended survey of the Des Moines school system and provides for instruction in technical work in addition to academic subjects.

The course is based upon the provisions of the Smith-Hughes law, and offers instruction in automobile repairing, printing, furniture and cabinet making for the boys, and also in practical home making, cooking and sewing for girls.

Philadelphia schools are to receive $10,000 for vocational training under the Smith-Hughes law. Last year it cost approximately $100,000 to maintain evening high and trade schools in the city.

A course in telegraphy for women operators has been established at the Girls' Vocational High School, Minneapolis, as a war measure. It is estimated that 54 women have been enrolled in this course during the year. Of these, sixteen from the advanced class have been inducted into industrial work within the past few months.

The Head Assistants and Elementary Principals' Associations of Chicago have approved the efforts made to decentralize the vocational guide bureau and the work certificate office of the board of education. As conducted in the past the bureau is alleged to have taken on the character of an employment office and as such has failed to meet the individual problems of children who must select their life vocations. A second complaint against the system is that it fails to provide for a committee of physicians to conduct careful examinations of the children who seek employment. Supt. John D. Shoop has proposed that state and governmental employment agencies take charge of the employment department, leaving the bureau to give attention to the selection of work. It is planned to establish committees of five teachers in each school to help the bureau in its work.

Two part-time classes have been opened at the shops of the Kansas City Southern Railroad at Pittsburg, Kans., for the benefit of employed apprentices. The classes are under the direction of H. C. Givens, director of the industrial arts department of the Kansas Manual Training Normal School (Pittsburg) and have met a great need on the part of shop employes.

The Normal School has also successfully conducted night classes in automobile and machine shop work. These have been so well patronized that additional instructors have been employed and enrollments discontinued.

THE WAR AND THE SCHOOLS.

New York, N. Y. Two classes for the training of army mechanics have been opened in the Murray Hill Evening Trade School and the Brooklyn Evening Technical School.

Four thousand nine hundred school children of Elgin, Dundee, Rutland, Burlington, Plato, Hampshire and Hanover townships in Illinois, under the direction of their teachers completed a total of 55,840 articles for war use during the past school year. The report which was compiled by the chairman of the Elgin chapter of the Red Cross, showed that the entire output of work was accomplished during a period of four months, with an expenditure of only $149.66. The members of the Junior Red Cross Chapter engaged in the sale of Liberty Bonds, War Savings Stamps, garden making, French and Belgian relief work, book collecting, making of hospital supplies, sewing and knitting, and the making of furniture for the convalescent hospitals.

Bloomsburg, Pa. A vocational school for drafted men has been opened. Wireless operation, carpentry and automobile mechanics are taught.

Eau Claire, Wis. Classes in radio and buzzer operation have been continued during the entire summer.

The Beloit Vocational School, at Beloit, Wis., is giving machine shop practice to men attending the motor truck school at Beloit College. The class hours are from 8:30 A. M. to 4:30 P. M., for one-eighth of the time. Mr. Harry Oelschlager is instructor.

Added attention is to be given next year in vocational education in West Virginia for the mechanical training of soldiers. The state is to receive $30,000 from the federal vocational funds next year.

All persons going to Canada hereafter to study the workings of the Canadian department of vocational rehabilitation of soldiers must be provided with credentials from the United States Federal Board of Vocational Education, according to a new ruling. So many visitors have been going to Canada for that purpose it has become necessary to keep out mere curiosity seekers.

Grand Forks, N. D. Classes for 154 drafted men have been established in the army vocational training school at the University of North Dakota.

An auto mechanics school has been opened at Loyola University, New Orleans, La. The classes are free to drafted men.

Lafayette, Ind. A course in radio and buzzer operation and the theory of wireless telegraphy has been opened at the vocational school.

Oakland, Cal. Automobile and gas engine repair work are offered at the Oakland Technical High School. The course covers eight weeks.

Buffalo, N. Y. The educational director of the war department has commended the character of the instruction offered in the Buffalo vocational schools to army mechanics. It is proposed to continue the instruction thruout the year.

Long Beach, Cal. An army tire repair school is conducted in connection with the Miller Rubber Company's tire factory. Each month a class of enlisted men puts in four weeks, with six hours of work on the repairing of tires.

The high schools of Los Angeles, Cal., have been turned over to the war department for the training of drafted men in army mechanics. The men are from class one and come from all parts of the state. The instruction covers gas engine repairing, carpentering, ignition, forge and blacksmith work, automobile repairing, radio operation, electrical construction, tractor work, sheetmetal work and concrete construction.

New York, N. Y. Four hundred and twenty-five soldiers undertook during the summer, the vocational course at the Vocational School for Boys. The work is under the direction of Charles J. Pickett.

The Federal Board of Vocational Education, it is announced, is planning to use the facilities of the business colleges of the country for the training of disabled soldiers. The men will be sent to schools nearest to their homes for training and board and tuition will be paid by the government.

Toledo, Ohio. Plans have been made for the vocational training of boys and girls over 16 years of age and for men of draft age who have not been called into army service. The work is to be carried on in day and night courses.

Kansas City, Mo. Vocational training for war work has been begun at the Polytechnic Institute for men of draft age listed in classes three and four. The instruction covers radio work, gas engine repair, machine shop and motor car repairing.

Chicago, Ill. Classes in radio and buzzer work are to be continued at Phillips, Lane and Schurz high schools.

The Federal Board of Vocational Education has approved the plan of the Arkansas University for the training of returned disabled soldiers as teachers of agriculture in high schools. The plan was originated by Mr. E. B. Matthew of the University and provides that Arkansas men disabled for further service shall be selected for university training where their education and ability make them especially qualified for teaching positions. Such men must have had the equivalent of a high school education and must in addition take a four-year course at the University. Their salary will continue while they are in training at the University.

Charlestown, W. Va. A vocational training school for men subject to draft call has been established.

The schools of Norristown, Pa., have undertaken a number of war activities. Purchases of the pupils in thrift stamps amounted to $61,290.50 and $1,032.25 have been reserved for Red Cross purposes. In addition, the pupils have deposited a total of $11,476 in the school bank.

A total of 1,142 home gardens have been worked by the pupils and lessons on food conservation, community and national life and current national and international events have been carried out in the curriculum. The pupils have made two hundred scrapbooks for the hospitals and a large quantity of knitted goods and hospital supplies for the Red Cross.

Dunwoody Industrial Institute, Minneapolis, Minn., at the annual commencement exercises on May 13th, issued diplomas to a large number of students who had completed courses at the Institute. The work is divided into departments for the civilian day school, part-time school, evening school, war training, and printing. The subjects taken by the students include automobile repair and construction, building construction, drawing and design, electrical construction, gas manufacture, heat treatment, machine shop practice, plumbing, printing, radio, sheet-metal work, telephony, steamfitting, welding, army baking, blacksmithing, ship carpentry, aviation carpentry, copper smithing, navy piloting, army truck driving, and munition work. The Institute co-operates with the war and navy departments of the government, the Federal Board for Vocational Education, the Red Cross, Aero Club of Minneapolis, the University of Minnesota, and the Minnesota State Board for Vocational Education.

The University of Minnesota has organized a special summer course for vocational teachers. Additional courses under the direction of Prof. M. J. Van Wagenen will be organized for the regular academic year. Short courses in various industrial centers and evening courses are in contemplation.

War Activities in the Duluth, Minn., Public Schools, 1917-18. During the year just closed the pupils and teachers were active in the sale of thrift stamps and Liberty Bonds and in the collection of funds for the Armenian and Syrian Relief. The children under the direction of the teachers, made war posters, game boards, joke books. comfort bags, quilts, refugee garments and knitted articles for the soldiers. Sales of food and wearing apparel made in the classes were held, the proceeds amounting to $255. In all the work, attention was given to the educational side, to accuracy and to economy in the use of funds and materials. Old but usable materials were utilized as far as possible. A total of 36 schools were engaged in the work, with a chairman in charge of each building. Miss Gertrude L. Carey acted as chairman of the general committee and Supt. K. J. Hoke gave freely of his advice and support.

HONOR ROLL

Frank S. Pugh, supervisor of manual arts, Porto Rico, National Army.

P. J. MacMillan, Porto Rico, Third Officers' Training Camp, Las Casas, San Juan, Porto Rico.

The following industrial arts teachers of the schools of Rochester, N. Y., are doing service in the army and navy: E. H. Kennell, W. H. Carlisle, E. A. Roberts, A. V. Fagan, Howard Bennett, A. H. Claire, and I. L. Leonard.

Mr. E. W. Gesswein has been elected supervisor of manual training at Salt Lake City, Utah, to succeed Mr. Milton Clauser. Mr. Gesswein is a graduate of Pratt Institute and holds a degree of bachelor of science from Teachers College, Columbia University.

Mr. G. H. Flannigan has been elected supervisor of manual arts at Galesburg, Ill.

Mr. Ralph A. Loomis has conducted summer classes in manual training at Camp Cayuga, in Essex County, N. Y.

NEW BOOKS.

Sheetmetal Workers' Manual.

By L. Broemel, with several chapters by J. S. Daugherty. Flexible leather fabric, 552 pages, illustrated. Price, $2. Frederick J. Drake & Co., Chicago.

Sheetmetal working has been slow to receive recognition in American schools, largely because the manual arts received their first impetus thru woodworking and partly because there has been a lack of literature on sheetmetal and the sheetmetal trades. This latter deficiency is being rapidly overcome and the present book will make impossible the claim that there is no complete standard work on the market.

The author has recognized from long association with the trade and from pioneering in the introduction of sheetmetal courses in technical schools that there has existed a need for a complete book that will take up all the advanced machine and hand processes of working sheet iron, copper and zinc and that includes at the same time the most rudimentary information sought by the novice. The book supplies both types and, in addition, supplies a great amount of related data on forging, oxy-acetylene welding and cutting. Very brief and surprisingly authoritative chapters on the nature and properties of metals, practical geometry and mensuration, and useful tables are added.

The book appeals to us as most valuable for its purpose.

Principles of Mechanism.

By Walter H. James and M. C. Mackenzie. Cloth, 241 pages. Price, $1.50. John Wiley & Sons, New York.

Two instructors in the Massachusetts Institute of Technology have collaborated to produce this elementary textbook. The book appeals to us for its simplicity and completeness and the very sane manner in which complicated mathematical calculations have been obviated. The book should find ready acceptance in evening classes and in trade schools. A great abundance of practical problems is provided in the text and in an appendix.

Mechanical Drawing Problems.

By Charles William Weick. Cloth, 153 pages; illustrated. Price, $1.25. McGraw-Hill Book Company, New York.

A curious inconsistency has existed in the field of mechanical drawing. The subject has been necessarily taught on the basis of problems while the majority of textbooks have been developed on an information,—it may almost be termed encyclopedic—plan. The few books which consisted chiefly of problems have been little more than collections of plates that required mostly mechanical copying, or the mere completion of sketches which contained all the essentials.

This book is intended to present just sufficient information and directions to make the working out of each problem clear but to require a maximum of thought—of reasoning—on the part of the student. The teacher is required to present the general aspects of the problem and to give individual aid to solve the personal difficulties of students. The problems are splendidly graded and are sufficient in number and variety to prepare the students to undertake practical machine drafting. The introduction contains a very brief treatment of the conventions of drawing, the materials and instruments, and the simplest mathematical constructions needed for the solution of the problems.

Twelve important tables which the draftsman requires daily are added to the book.

The book appeals to us as the most decided advance in mechanical drawing textbooks of the past five years.

Theory and Practice of Color.

By Bonnie Snow and Hugo B. Froehlich. Cloth, quarto, 54 pages. Illustrated with hand-painted plates. The Prang Company, Chicago, New York.

The present authors have nowhere demonstrated their ability as teachers so well as in this book. For whatever mysterious, difficult and involved there may be in the attractive subject of color is here made simple, clear and usable. The book is the first accurately illustrated school volume that we have seen and this fact, for which the publishers are to be given great credit, makes the text doubly valuable.

The authors have no new theory in color. At the same time they have not allowed their interest in the subject as artists to consider color without reference to the viewpoints of both the physicist and the chemist. In nine brief chapters they have presented the most generally accepted principles of color and color combination and to this treatment they have added four chapters with practical discussions of the psychology of color and the application of color to costume, interior decoration and commercial design.

The book is the first teachable volume in the American market and should find wide adoption in high schools and normal schools.

PUBLICATIONS RECEIVED.

A Statistical Consideration of the Number of Men Crippled in War and Disabled in Industry. I. M. Rubinow. Series 1, No. 4, of the Red Cross Institute for Crippled and Disabled Men, New York City. The pamphlet discusses losses in killed, wounded, and those lost thru disease in past wars, also present war losses in disabled, killed, captured or missing, number of cripples in the United States, economic capacity of cripples, statistics of crippled children in Germany, and estimated number of permanent disabilities produced thru industrial accidents in the country.

Economic Consequences of Physical Disability: A Case Study of Civilian Cripples in New York City. John C. Faries. Series 1, No. 2, of the Red Cross Institute for Crippled and Disabled Men, New York City. The present study was begun under the direction of Dr. Edward T. Devine during the summer of 1917, and sought to learn what light the attempts of cripples to readjust themselves to industry after injury might throw upon the problem before the Institute. The cases selected for study were those of men between 16 and 55 who had been injured since January, 1915. The pamphlet discusses sources of information, methods of investigation, industrial readjustment, and apparent needs of cases studied.

Working Drawings and Photographs of Farm Buildings for Use in Manual Training Schools. Prepared by the National Lumber Manufacturers' Association, Chicago. This pamphlet in fifteen pages gives a number of drawings, photographs and descriptions of various farm buildings which may be erected successfully by manual training classes.

Vocational Re-education of Soldiers and Sailors Provided by Congress. Vol. 1, No. 3, of the Federal Board of Vocational Education. This subject is discussed in a variety of ways in the July number of the Vocational Summary published by the Federal Board at Washington, D. C.

The Evolution of National Systems of Vocational Re-education for Disabled Soldiers and Sailors, By Douglas C. McMurtrie. Issued by the Federal Board of Vocational Education, Washington, D. C. This pamphlet gives the experience of France, Belgium, England, Italy, Germany, Austria-Hungary, Canada, and other British Dominions in the re-education of soldiers disabled in the war. Among the lines of work undertaken are agriculture, tailoring, cabinet making, accounting, chemistry, motor mechanics, oxy-acetylene welding, photographic and motion picture operating, commercial education, magneto assembling, printing, typewriting, bench woodworking and gas tractor operation.

The Manual Arts as Vocations. Prepared under the direction of F. D. Crawshaw and edited by James R. Coxen. Issued by the Extension Division of the University of Wisconsin, Madison. This pamphlet lists and describes about twenty vocations which students in the manual arts may select as their life work. The bulletin, while it aims to answer questions of students, does not offer a complete scientific analysis of the different pursuits but rather gives a brief summary of a few of the important lines.

Agricultural Instruction in the High Schools of Six Eastern States. C. H. Lane. Bulletin No. 3, 1918, issued by the Bureau of Education, Washington, D. C. This pamphlet is intended to improve the instruction offered in agriculture in secondary schools and to promote the general cause of agricultural education.

Farm Home Conveniences. Madge J. Reese. Farmers' Bulletin 927, U. S. Department of Agriculture, Washington, D. C. This pamphlet illustrates and describes the making of a dozen farm home conveniences which save time and effort and which may be made at a small expense.

Vocational Training in War Time. Bulletin No. 27, National Society for Vocational Education. A series of addresses delivered at the eleventh annual convention of the society, at Philadelphia, February, 1918.

Stories of the Prints. A story of a Japanese Print, prepared by J. C. Dana, of the Newark, N. J., Museum, for general use in the teaching of art to pupils in elementary schools.

Bulletin of the U. S. A. General Hospital No. 2, Fort McHenry, Md. Published monthly by the officers and printed by patients and enlisted men of Fort McHenry.

Reference Material for Vocational Agricultural Instruction. Bulletin No. 14, Series No. 2, Federal Board of Vocational Education, Washington, D. C. This pamphlet was prepared by C. H. Lane, agent for agricultural education in the southern states, and is intended to supply information suitable for teaching agriculture.

NEWS OF THE MANUFACTURERS

INFORMATION ON WOOD.

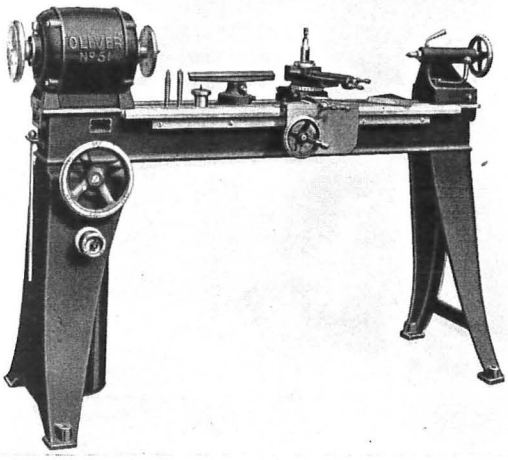
Teachers of manual training are continually seeking material for new problems in woodwork and for industrial projects in their carpentry and cabinet making classes. Every teacher who is in want of such information, will find a recent pamphlet of the National Lumber Manufacturers' Association of considerable help. This pamphlet lists nearly three hundred separate bulletins and books which have been issued by commercial lumber organizations, and which are available free or for a nominal sum.

Readers of the *Magazine* may obtain a copy of the pamphlet "Information on Wood and Where to Find It" by addressing the National Lumber Manufacturers' Association, Lumber Exchange, Chicago, Ill.

NEW OLIVER SPEED LATHE.

The Oliver Machinery Company has recently offered for school use its well known No. 51 speed lathe with a new four-speed, alternating current motor headstock. This equipment is designed for three phase, sixty-cycle, 220-volt current. The firm already equips the No. 51 lathe with a direct and a single phase motor headstock.

The plate illustrates the machine with hand feeding carriage and compound swivel rest, but the lathe may be furnished with plain bed in four or five-foot lengths so as to turn 24 or 36 inches between centers respectively. The swing of the lathe is the same as the other No. 51 motor head speed lathes, namely twelve-inch diameter.



"Oliver" No. 51 Motor Head Speed Lathe for Alternating Current.

The motor headstock and ball bearings are totally enclosed. The rear end of the motor is fitted with a combined hand wheel and face plate. The outer end is rounded off just exactly like a hand wheel and the inside face is curved in so as to give advantage of the hand wheel shape but the outer surface is perfectly straight and flat and forms a perfect face plate for rear-end turning.

The controller of the motor is similar to a street car controller, only of course very much smaller, mounted inside of the left-hand leg. This controller is operated from the hand wheel shown in the front which is marked in the various positions as follows: Off, 570 RPM, 1140 RPM, 1725 RPM, and 3450 RPM. Whenever any one of these marks is at the top, the motor operates as indicated by the mark and the mechanism is such that the hand wheel cannot be turned in the wrong direction.

The firm has complete literature and price lists which it will send to any interested reader of the *Magazine*.

A NEW BOOK ON SHEET METAL.

On another page of this issue is printed a review of a noteworthy book on sheetmetal work. The book is of more than ordinary interest because it is the first work of its kind and because it is a real labor of love on the part of a man who has given many years to the promotion of the sheetmetal industry.

Mr. L. Broemel, who wrote the book, is head of the sheetmetal machinery department of Peck, Stow and Wilcox Company and has spent nearly a decade in the study of the trade and of trade conditions. Few men have had the opportunity of observing conditions so closely and of becoming so intimately acquainted with the individual needs of a great number of journey-

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men and employers in the matter of trade information, processes, etc.

For several chapters on the teaching of the elements of working sheetmetals, Mr. Broemel has had the assistance of Prof. J. S. Daugherty of the Carnegie Technical Institute. For the great bulk of the book, however, he has drawn upon his personal experience and on technical information gathered in his office. Particularly valuable are chapters on related matters which every worker must be familiar with, e. g., brazing, oxy-acetylene welding, electric welding, and hand forging. The chapters on pattern drafting and practical geometry are strongly emphasized because they convey information that is fundamental to all practical work.

The book has been published with the imprint of F. J. Drake and Co., Chicago, and orders will be filled by the Southington office of Peck, Stow and Wilcox Company.

PERSONAL NEWS.

Mr. George F. Buxton, director of the manual arts department, Stout Institute, has resigned.

Mr. Curtis R. Carman, of the manual training department, Duluth, Minn., has resigned to accept a position at Cleveland, O. Mr. Carman completed eleven years as an instructor in the Cleveland schools.

O. A. Saxhaug, of Crosby, Minn., has resigned to enter the war training course at Dunwoody Institute.

Mr. Frank S. Pugh, formerly supervisor of manual arts at San Juan, Porto Rico, has resigned to enter the military service. Mr. P. J. MacMillan, who succeeded him, has also resigned to enter the Third Officers' Training Camp, Las Casas, San Juan, Porto Rico.

Mr. George J. Loewy, principal of the Murray Hill and Brooklyn Vocational Schools, New York City, has been appointed director of the Division of Vocational Education.

Francis W. Kirkham, state director of vocational education of Utah, has been appointed director of war training courses for the state. He will have charge of the organization and supervision of buzzer and radio classes.

A. E. Shanklin, of Ada, O., has been appointed instructor in manual training at De Graff.

Hadden W. James, of Humboldt, Kans., has been appointed instructor in manual training at Greeley, Colo.

A. L. Ward, of Clarksville, Ia., has been appointed director of manual training at Mt. Pleasant.

A. F. Payne, associate superintendent of schools and vocational director at Johnstown, Pa., is giving one day a week to the work of organizing employes in local industries in government work.

Orren R. Tarr has been appointed prevocational instructor in manual arts at the Dorchester High School, Boston.

L. T. Smith has resigned from the manual training department at Washington, Ia., and will enter some branch of army service.

N. F. Fultz, of Anderson, Ind., has resigned to become director of welfare work and head of the vocational department of the Remy Electric Company. A new building has been erected by the company for the vocational department.

Robert Mulholland, assistant manual training teacher at Parkersburg, W. Va., has resigned to enter war work.

Burton A. Prince, principal of the Industrial School at Westfield, Mass., has been given a year's leave of absence to enter the Y. M. C. A. work in France. Mr. Chester C. Derby will be in charge during Mr. Prince's absence.

George M. Brace, head of the manual training department in Central High School, St. Paul, has been appointed director of manual training for all the schools.

Alvin E. Dodd, formerly secretary of the National Society for Vocational Education, has been called to Washington as executive secretary of the Committee on Classification of Personnel in the army under the adjutant-general. The committee has charge of the occupational classification and assignment of drafted men and their placement in army organizations where their special qualifications are most needed.

Miss Marie E. Waller, of Oak Park, Ill., has been appointed instructor in domestic science in the Ottawa Township High School at Ottawa, Ill.

Harvey E. Phillips, formerly consulting engineer of the signal corps school at St. Paul, Minn., has been appointed instructor of the ignition class at Indianapolis, Ind.

President Graham of the University of North Carolina has been appointed a member of the Emergency Council of Education which has in charge the national campaign for recruiting the college training corps authorized by the war department.

Mrs. William E. McNamara and *Miss Martha N. Brooks*, two Massachusetts women, have entered upon the government course for employment managers given at Harvard University. Mrs. McNamara is field secretary for the National Civic Federation and Miss Brooks is a chemist and director of first aid work in a cement factory.